TOSHIBA

Leading Innovation

UNINTERRUPTIBLE POWER SYSTEM (UPS)

1600XP SERIES

INSTALLATION AND OPERATION MANUAL

SINGLE PHASE - 3.6/6/8/10/14/18/22 KVA

Part # 60616-008
July 2012

Manufactured in the USA

c UL US

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NOTICE

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The instructions contained in this manual are not intended to cover all of the details or variations in equipment, or to provide for every possible contingency concerning installation, operation, or maintenance. Should further information be required or if problems arise which are not covered sufficiently, contact your Toshiba sales office.

The contents of this instruction manual shall not become a part of or modify any prior or existing agreement, commitment, or relationship. The sales contract contains the entire obligation of Toshiba International Corporation UPS Division. The warranty contained in the contract between the parties is the sole warranty of Toshiba International Corporation UPS Division and any statements contained herein DO NOT create new warranties or modify the existing warranty.

Any electrical or mechanical modifications to this equipment without prior written consent of Toshiba International Corporation will void all warranties and may void the UL/CUL listing. Unauthorized modifications can also result in personal injury, loss of life, or destruction of the equipment.

QUALIFIED PERSONNEL ONLY

Qualified Personnel are those who have the skills and knowledge relating to the construction, installation, operation, and maintenance of the electrical equipment and have received safety training on the hazards involved (Refer to the latest edition of NFPA 70E for additional safety requirements).

UNINTERRUPTIBLE POWER SYSTEM (UPS)

Please complete the following information and retain for your records.

Unless otherwise specified, the warranty period for the UPS or UPS part is 36 months from the shipment date (see Toshiba International Corporation bill of lading).

Unless otherwise specified, the warranty period for a UPS battery is 24 months from the shipment date (see Toshiba International Corporation bill of lading).

JOB NUMBER _____

MODEL NUMBER _____

SERIAL NUMBER _____

APPLICATION _____

SHIPMENT DATE _____

INSTALLATION DATE _____

INSPECTED BY _____

Purpose

This manual provides information on how to safely install your Toshiba International Corporation power electronics product. This manual includes a section of general safety instructions that describes the warning labels and symbols that are used throughout the manual. Read the manual completely before installing, operating, or performing maintenance on this equipment.

This manual and the accompanying drawings should be considered a permanent part of the equipment and should be readily available for reference and review. Dimensions shown in the manual are in metric and/or the English customary equivalent.

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Toshiba Customer Support Center

Contact the Toshiba Customer Support Center for assistance with application information or for any problems that you may experience with your Uninterruptible Power System (UPS).

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Fax (713) 896-5212

You may also contact Toshiba by writing to:

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Houston, Texas 77041-9990
Product Manager

For further information on Toshiba products and services, please visit our website at:

www.toshibaups.com

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1. General Safety Instructions

DO NOT attempt to transport, install, operate, maintain or dispose of this equipment until you have read and understood all of the product safety information provided in this manual.

1.1 Symbols

The symbols listed below are used throughout this manual. When symbols are used in this manual they will include important safety information that must be carefully followed.

Safety Alert Symbol indicates that a potential personal injury hazard exists.

Prohibited Symbol indicates **DO NOT** take action.

Mandatory Symbol indicates that the following instruction is required.

Ground Symbol indicates the location of the equipment grounding conductor.

Electrical - Voltage & Shock Hazard Symbol indicates parts inside may cause electric shock.

Explosion Hazard Symbol indicates parts may explode.

1.2 Signal Words

The signal words listed below are used throughout this manual. When the words DANGER, WARNING, CAUTION and NOTICE are used in this manual they will include important safety information that must be carefully followed.

The word **DANGER** in capital letters preceded by the safety alert symbol indicates that an **imminently hazardous** situation exists, and if not avoided **will result in loss of life or serious injury to personnel.**

The word **WARNING** in capital letters preceded by the safety alert symbol indicates that a **potentially hazardous** situation exists, and if not avoided **may result in loss of life or serious injury to personnel.**

The word **CAUTION** in capital letters preceded by the safety alert symbol indicates that a **potentially hazardous** situation exists, and if not avoided **may result in minor or moderate injury.**

The word **NOTICE** in capital letters without the safety alert symbol indicates a **potentially hazardous** situation exists, and if not avoided **may result in equipment and property damage.**

1.3 Regulatory Compliance Statement

FCC Class A Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Notice: The FCC regulations provide that changes or modifications made to this device that are not approved by Toshiba International Corporation may void the authority granted to the user by the FCC to operate this equipment.

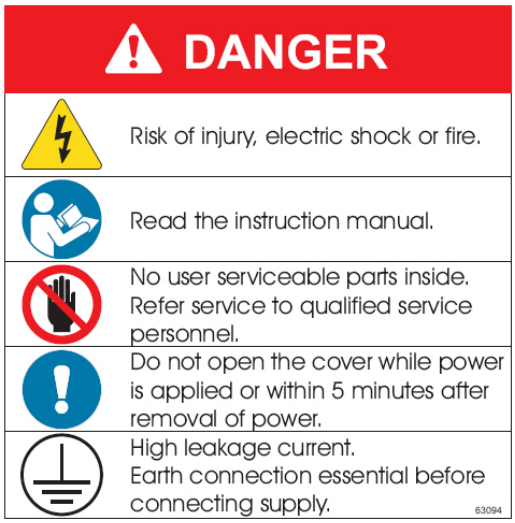
EMC Directive Class A Note

This UPS is commercial in design and not intended for use at anytime in a Residential Environment.

2. Equipment Warning Labels

The following pages show examples of warning labels that may be attached to either the interior or exterior of the UPS. Do not remove or cover any of the labels. If the labels are damaged or if additional labels are required, contact your equipment representative for additional labels.

These labels are placed to provide useful information or to indicate an imminently hazardous situation that may result in severe equipment/property damage, serious injury, or loss of life if instructions are not followed.


DANGER
Risk of injury, electric shock or fire.
Read the instruction manual.
No user serviceable parts inside.
Refer service to qualified service personnel.
Do not open the cover while power is applied or within 5 minutes after removal of power.
High leakage current.
Earth connection essential before connecting supply.
63094

P/N 63094 – External warning sign.

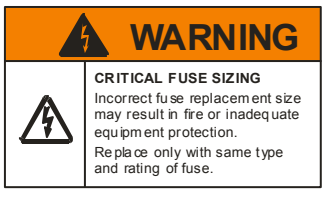
- Unit contains potentially dangerous voltages.
- Read the instruction manual before operating.
- There are no user serviceable parts inside. Refer service to qualified personnel.
- Do not open the cover while power is applied, or within five minutes after removal of power.
- Potentially hazardous leakage current may exist. Ensure the grounding is connected before connecting the utility power.

DANGER/ATTENTION
Risk of electrical shock. Do not touch uninsulated battery terminals. Batteries should be serviced by qualified service representative only. Miswiring of battery could result in electrcal shock and/or fire.
Risque de choc electrique. Le circuit des batteries nest pas esolede secteur. Les cosses des batteries peuvent presenter une tension dangereuse part rapport a la terre. Verifier avant de toucher.

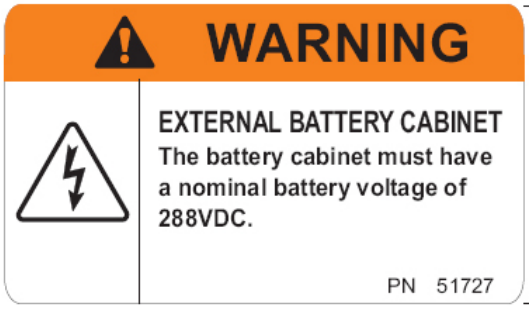
P/N 48518 – Battery terminals can deliver dangerous electrical shock. Service by qualified service representatives only.

WARNING
This unit contains sealed lead acid batteries. Lack of preventative maintenance could result in batteries exploding and emitting gasses and/or flame. Annual preventative maintenance must be performed by an authorized, trained technician.

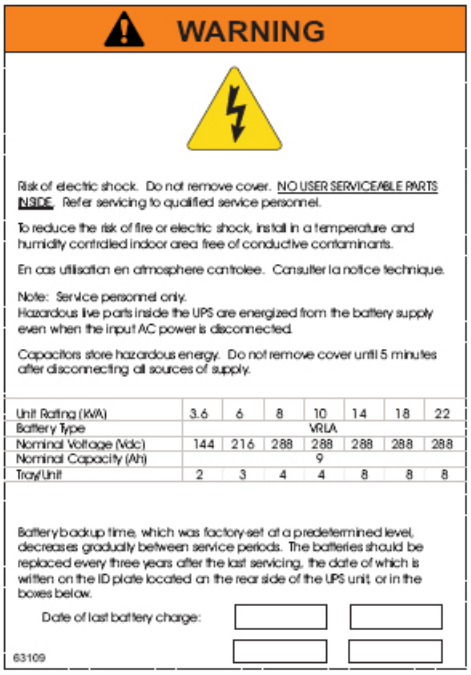
P/N 49455 – UPS Batteries require annual preventative maintenance. Failure to perform regular maintenance could result in batteries exploding, or emitting gasses or flame.


WARNING
CRITICAL FUSE SIZING
Incorrect fuse replacement size may result in fire or inadequate equipment protection.
Replace only with same type and rating of fuse.

P/N 49455 – Replace Fuse only with one of same type and range. Incorrect fuse size may result in equipment damage.

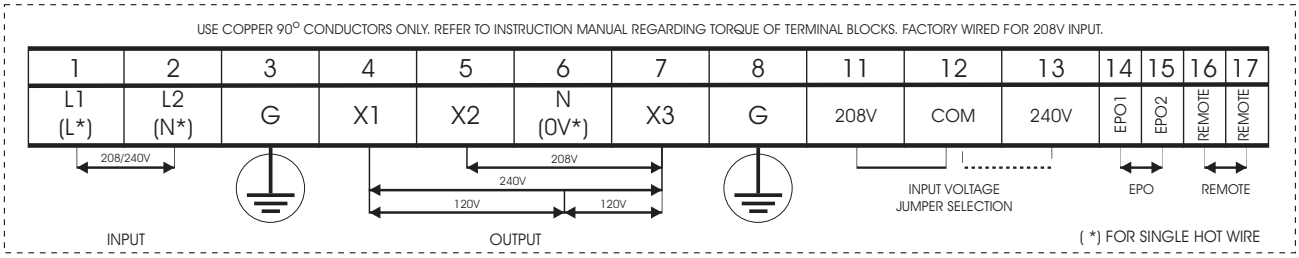


Battery Cabinet Warning Label.
* For reference only, DC voltage varies by kVA size of the UPS.


WARNING
Risk of electric shock. Do not remove cover. NO USER SERVICEABLE PARTS INSIDE. Refer servicing to qualified service personnel.
To reduce the risk of fire or electric shock, install in a temperature and humidity controlled indoor area free of conductive contaminants.
En cas utilisation en atmosphere controlee. Consulter la notice technique.
Note: Service personnel only.
Hazardous live parts inside the UPS are energized from the battery supply even when the input AC power is disconnected.
Capacitors store hazardous energy. Do not remove cover until 5 minutes after disconnecting all sources of supply.
Unit Rating (KVA) 3.6 6 8 10 14 18 22
Battery Type VRLA
Nominal Voltage (Vdc) 144 216 288 288 288 288 288
Nominal Capacity (Ah) 9
Tray/Unit 2 3 4 4 8 8 8
Battery backup time, which was factory-set at a predetermined level, decreases gradually between service periods. The batteries should be replaced every three years after the last servicing, the date of which is written on the ID plate located on the rear side of the UPS unit, or in the boxes below.
Date of last battery charge:
63109

P/N 63109 – There are no user-serviceable parts behind cover. Wait five minutes after disconnecting the UPS to allow the internal capacitors to discharge completely.

Date of last recorded battery change.


USE COPPER 90° CONDUCTORS ONLY. REFER TO INSTRUCTION MANUAL REGARDING TORQUE OF TERMINAL BLOCKS. FACTORY WIRED FOR 208V INPUT.
1 2 3 4 5 6 7 8 11 12 13 14 15 16 17
L1 (L*) L2 (N*) G X1 X2 N (0V*) X3 G 208V COM 240V EPO1 EPO2 REMOTE REMOTE
208/240V
208V
240V
120V 120V
INPUT VOLTAGE JUMPER SELECTION
EPO
REMOTE
INPUT
OUTPUT
(*) FOR SINGLE HOT WIRE

P/N63093 - Power Terminal Label

3. Important Safety Instructions

This manual contains important instructions that should be followed during the installation and maintenance of the UPS and its batteries.

Hardwired UPS units are not equipped with an over-current protection device nor an output disconnect for the AC output. A circuit breaker should be provided by the user between the UPS output and the load input. This device should be rated as follows:

240VAC RATING	3.6 kVA	6 kVA	8 kVA	10 kVA	14 kVA	18 kVA	22 kVA
	20 A	35 A	45 A	60 A	80 A	100 A	125 A

* Ratings are for an 80% rated device.

The nominal battery voltages for these models are as follows:

BATTERY VOLTAGE	3.6 kVA	6 kVA	8 kVA	10 kVA	14 kVA	18 kVA	22 kVA
	144 Vdc	216 Vdc	288 Vdc	288 Vdc	288 Vdc	288 Vdc	288 Vdc

Servicing of the batteries should only be performed by a qualified factory authorized representative who is knowledgeable about batteries and the required precautions. Keep unauthorized personnel away from batteries. To arrange for battery replacement, contact Toshiba Customer Support Center.

1. Turn off, lockout, and tagout all equipment before connecting the power wiring to the equipment or when performing maintenance.
2. The maximum ambient operating temperature is 104 °F (40 °C).
3. Access panels should only be removed by authorized Toshiba field Service personnel.
4. UPS servicing should be performed by qualified Toshiba representatives only.
5. Battery servicing should be performed by qualified Toshiba representatives only.
6. Contact your Toshiba authorized service center for battery replacement.

3.1 Qualified Personnel Only

Qualified personnel are those who have the skills and knowledge relating to the construction, installation, operation, and maintenance of the electrical equipment and have received safety training on the hazards involved (Refer to the latest edition of NFPA 70E for additional safety requirements).

Qualified personnel shall:

1. Have read the entire operation manual.
2. Be trained and authorized to safely energize, de-energize, ground, lockout and tag circuits and equipment, and clear faults in accordance with established safety practices.
3. Be trained in the proper care and use of protective equipment such as safety shoes, rubber gloves, hard hats, safety glasses, face shields, flash clothing, etc., in accordance with established safety practices.
4. Be trained in rendering first aid.
5. Be knowledgeable about batteries and their required handling and maintenance precautions.

For further information about workplace safety visit www.osha.gov.

⚠ CAUTION

Misuse of this equipment may result in human injury and equipment damage. In no event will Toshiba Corporation be responsible or liable for either indirect or consequential damage or injury that may result from the misuse of this equipment.

⚠ CAUTION

DO NOT dispose of the battery module in a fire. The batteries inside may explode.

⚠ CAUTION

DO NOT open or mutilate the batteries. Released electrolyte is harmful to the eyes and skin and could also be toxic.

To be performed by **Qualified Personnel Only**:

1. Verify that the UPS is off and that the power is disconnected from the power source.
2. Remove watches, rings or other metal objects.
3. Use tools with insulated handles to prevent inadvertent shorts.
4. Wear rubber safety gloves and boots.
5. DO NOT place tools or any metal parts on top of batteries.
6. Determine if the battery is inadvertently grounded. If inadvertently grounded, remove source of ground.

⚠ WARNING

Contact with any part of a grounded battery can result in electrical shock.

The likelihood of shock will be reduced if such grounds are removed prior to installation or maintenance.

4. Inspection/Storage/Disposal

4.1 Inspection

Inspect for shipping damage upon receipt of the UPS. Use caution when removing the unit from the pallet. Refer to labels or documentation attached to packing material.

4.2 Unpacking

Check the unit for loose, broken, bent or otherwise damaged parts. If damage has occurred during shipping, keep all original crating and packing materials for return to the shipping agent. The warranty does not apply to damage incurred during shipping. Ensure that the rated capacity and the model number specified on the nameplate conform to the order specifications.

4.3 Storage

During periods of non-use, the following guidelines are recommended for storage.

Storage Preparation

1. Power up the UPS and allow it to operate with no load for 24 hours to fully charge the batteries.
2. Stop the unit (see Stop Operation on page 16).
3. Place the MCCB switch (see page 60 - 61 for location) in the Off position.

Storing Conditions

- For best results, store the UPS in the original shipping container and place on a wood or metal pallet.
- Storage temperature: -4 – 104 °F (-20 – 40 °C).
- The optimum storage temperature is 70 °F (21 °C). A higher ambient temperature will require recharging more frequently during storage.

Avoid storage locations that:

- Are subject to extreme temperature changes or high humidity.
- Are subject to high levels of dust or metal particles.
- Are subject to excessive vibration.
- Have inclined floor surfaces.

Storage Maintenance

- If stored at an ambient temperature less than 68 °F (20 °C), recharge the batteries every 9 months.
- If stored at an ambient temperature of 68 – 86 °F (20 – 30 °C), recharge the batteries every 6 months.
- If stored at an ambient temperature of 86 – 104 °F (30 – 40 °C), recharge the batteries every 3 months.

4.4 Disposal

Contact your local or state environmental agency for details on disposal of electrical components and packaging in your particular area.

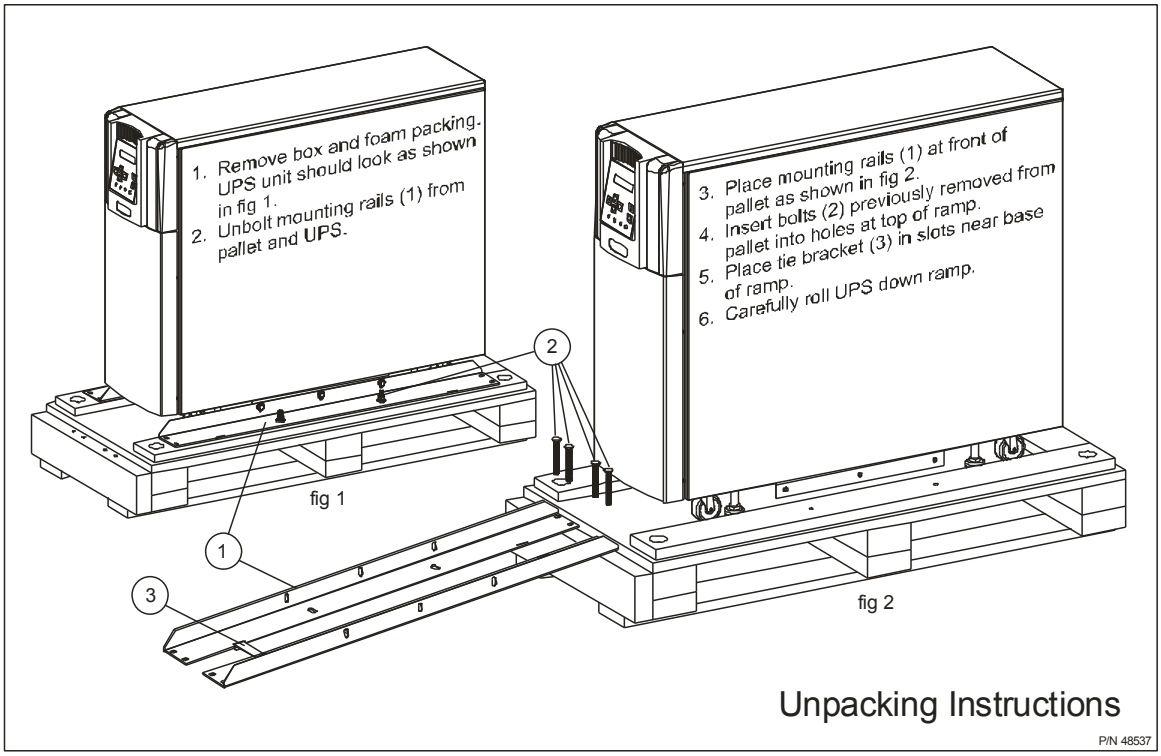
It is illegal to dump lead-acid batteries in landfills or dispose of improperly.

Please help our Earth by contacting the environmental protection agencies in your area, the battery manufacturer, or call Toshiba toll-free at (877) 867-8773 for more information about recycling.

5. Installation Precautions

NOTICE

1. Observe the following environmental restrictions:
   - Install the unit in a well-ventilated location; allow at least 4 inches (10 cm) on all sides for air ventilation and for maintenance.
   - Install the unit where the ambient temperature is within the range specified on pages 53 - 58.
   - DO NOT install the UPS in areas that are subject to high humidity.
   - DO NOT install the UPS in areas that allow exposure to direct sunlight.
   - DO NOT install the UPS in areas that allow exposure to high levels of airborne dust, metal particles, or flammable gases.
   - DO NOT install the UPS in areas near sources of electrical noise. Ensuring a proper earth ground will reduce the effects of electrical noise and will reduce the potential for electrical shock.
   - DO NOT install the UPS in areas that would allow fluids or any foreign object to get inside the UPS.
2. UPS is intended for permanent installation only. Install the unit in a stable, level and upright position that is free of excessive vibration.
3. Follow the instructions on the unpacking label affixed to the exterior of the UPS.


1. Remove box and foam packing. UPS unit should look as shown in fig 1.
2. Unbolt mounting rails (1) from pallet and UPS.
fig 1
3. Place mounting rails (1) at front of pallet as shown in fig 2.
4. Insert bolts (2) previously removed from pallet into holes at top of ramp.
5. Place tie bracket (3) in slots near base of ramp.
6. Carefully roll UPS down ramp.
fig 2
1
2
3
Unpacking Instructions
P/N 48537

4. Retain the shipping rails for use as permanent mounting of the UPS.

5. Once the installation is complete, use a 3/4 inch wrench to screw down the UPS leveling feet located next to the four casters, until the unit is no longer resting on the casters.
6. The UPS generates and can radiate radio-frequency energy during operation. Although RFI noise filters are installed inside of the unit, there is no guarantee that the UPS will not influence some sensitive devices that are operating near by. If such interference is experienced, the UPS should be installed farther away from the affected equipment and/or powered from a different source than that of the affected equipment.
7. It is the responsibility of the installer of this equipment to provide a suitable disconnect for the Control Panel supplying power to this equipment.

   This disconnect must:

   Be suitable for the Voltage and Full Load Ampere Rating of all downstream equipment supplied by the Panel;

   The supply disconnecting device shall be one of the following types:

   - Switch-disconnector, with or without fuses, in accordance with IEC 60947-3, utilization category AC-23B or DC-23B
   - As above, except one that has an auxiliary contact that in all cases causes switching devices to break the load circuit before the opening of the main contacts of the disconnector.
   - A circuit breaker suitable as an isolation device per IEC 60947-2
   - Any other switching device in accordance with an IEC product standard that also meets the isolation requirements of IEC 60947-1 and is appropriate for on-load switching of motors or other inductive loads;

   Be approved for use as a disconnect for the country in which this equipment is installed.

   Be provided with a Lock Out Tag Out capability in the Off (Down) position.

8. Allow 5 minutes after power is removed for internal capacitors to fully discharge before attempting to service the unit.
9. The user should provide output over-current protection for hardwired UPS systems. See Specifications section on pages 19 and 22 for the device rating.
10. After ensuring that all power sources are turned off and isolated in accordance with established lockout/tagout procedures, connect the power source wiring of the correct voltage to the input terminals of the UPS.
11. The end user must supply suitable strain relief for the power cord and the cord must extend a distance of 1/2 diameter beyond the clamp.
12. Connect the output terminals of the UPS to the load in line with local wiring regulations. Size the branch circuit conductors in accordance with NEC Table 310.16.

6. Conductor Routing and Grounding

1. Use separate metal conduits for routing the input power, output power, and control circuits.
2. Follow the wire size and tightening torque specifications listed on page 13.
3. Always ground the unit to reduce the potential for electrical shock and to help reduce electrical noise.
4. A separate ground cable should be run inside the conduit with the input power, output power, and control circuits.

⚠ WARNING	
	THE METAL OF CONDUIT IS NOT AN ACCEPTABLE GROUND.

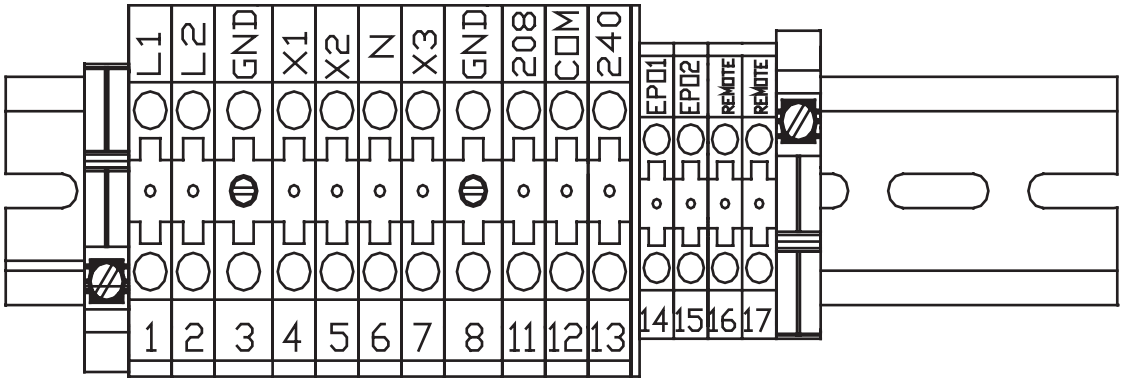
7. Operating Precautions

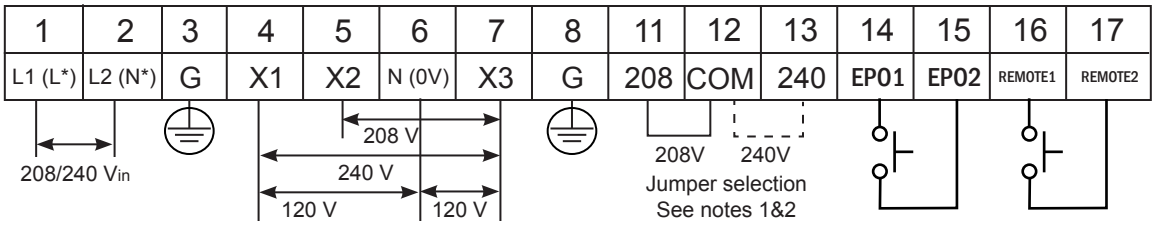
1. The UPS should not be powered up until the entire operation manual has been read.
2. The voltage of the input power source must be within the range of +10% to -30% of the rated input voltage. The input frequency must be within the rated input frequency range. Voltages and frequencies outside of the permissible range may activate the internal protection devices.
3. The UPS should not be used with a load that has a rated input that is greater than the rated output of the UPS.
4. DO NOT use the UPS to provide power to motors that require high starting current or with motors that require a long starting time, such as vacuum cleaners and machine tools (oversizing the UPS for lock rotor current would be required).
5. DO NOT insert metal objects or combustible materials in the ventilation slots of the UPS.
6. DO NOT place, hang, or paste any objects on the exterior surfaces of the UPS.
7. The capacitors of the UPS maintain a residual charge for a while after turning the UPS off.
8. DO NOT attempt to disassemble, modify, or repair the UPS. Repairs and servicing should only be performed by Toshiba Field Service personnel.
9. DO NOT remove any covers of the UPS when the power is on.
10. Turn the power on only after installing ALL of the covers.
11. If the UPS should emit smoke, produce an unusual odor, or make sound, turn the power off immediately.
12. Changing/replacing the UPS Batteries should only be performed by Toshiba field service personnel.
13. Warning signs should be placed on or near the load as a notification that the load is being powered by the UPS.
14. Additional warnings and notifications shall be posted at the equipment installation location as deemed required by **Qualified Personnel**.

8. UPS Connections

8.1 Terminal Block

The following illustration is a detail view of the terminal block and wiring connections used for 208/240 volt units (see pages 65-66 for terminal block location).





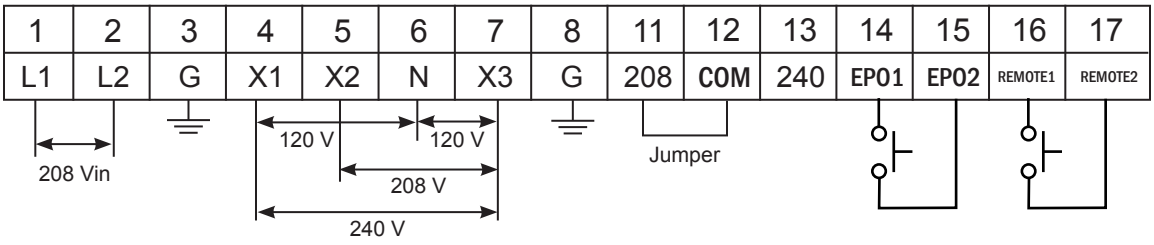
* – If only one input line is hot, connect hot line to terminal 1 (L), and connect the Neutral line to terminal 2 (N).

NOTE 1 – If AC input power is 208 Vac rated, short terminals 11 and 12 with a jumper wire. DO NOT jumper terminal 13 to 12 or 11. Factory Setting is 208Vac. **Use the jumper wire provided by Toshiba. DO NOT add any additional jumpers.**

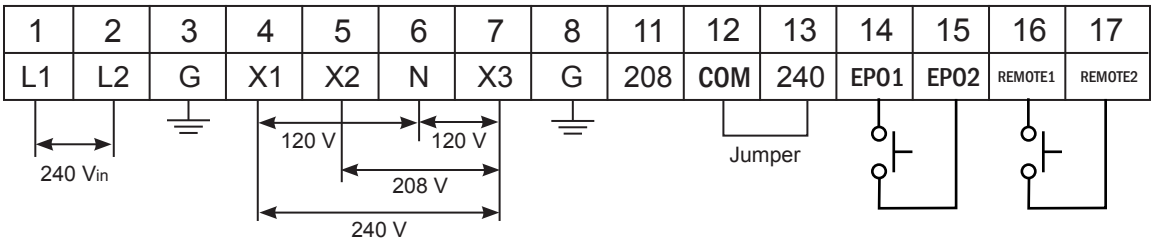
NOTE 2 – If AC input power is 240 Vac rated, short terminals 12 and 13 with a jumper wire. DO NOT jumper terminal 11 to 12 or 13. **Use the jumper wire provided by Toshiba. DO NOT add any additional jumpers.**

Input and Jumper wire/bus strip connection for:

208 Vin – Using provided jumper, connect terminals 11 – 12.

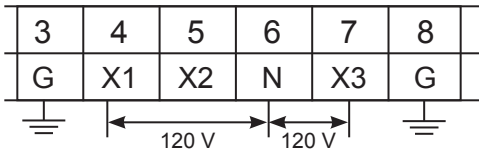


240 Vin – Using provided jumper, connect terminals 13 – 12.

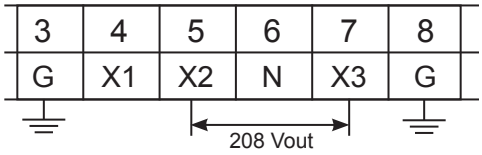


Output Cabling for:

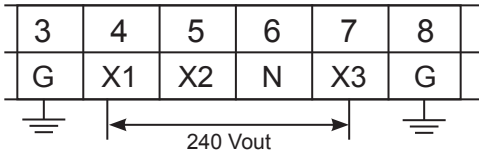
120 Vout
Connect load across Terminals 4 – 6 or 6 – 7.



208 Vout
Connect load across terminals 5 – 7.



240 Vout
Connect load across terminals 4 – 7.



8.2 Wire Size and Tightening Torque

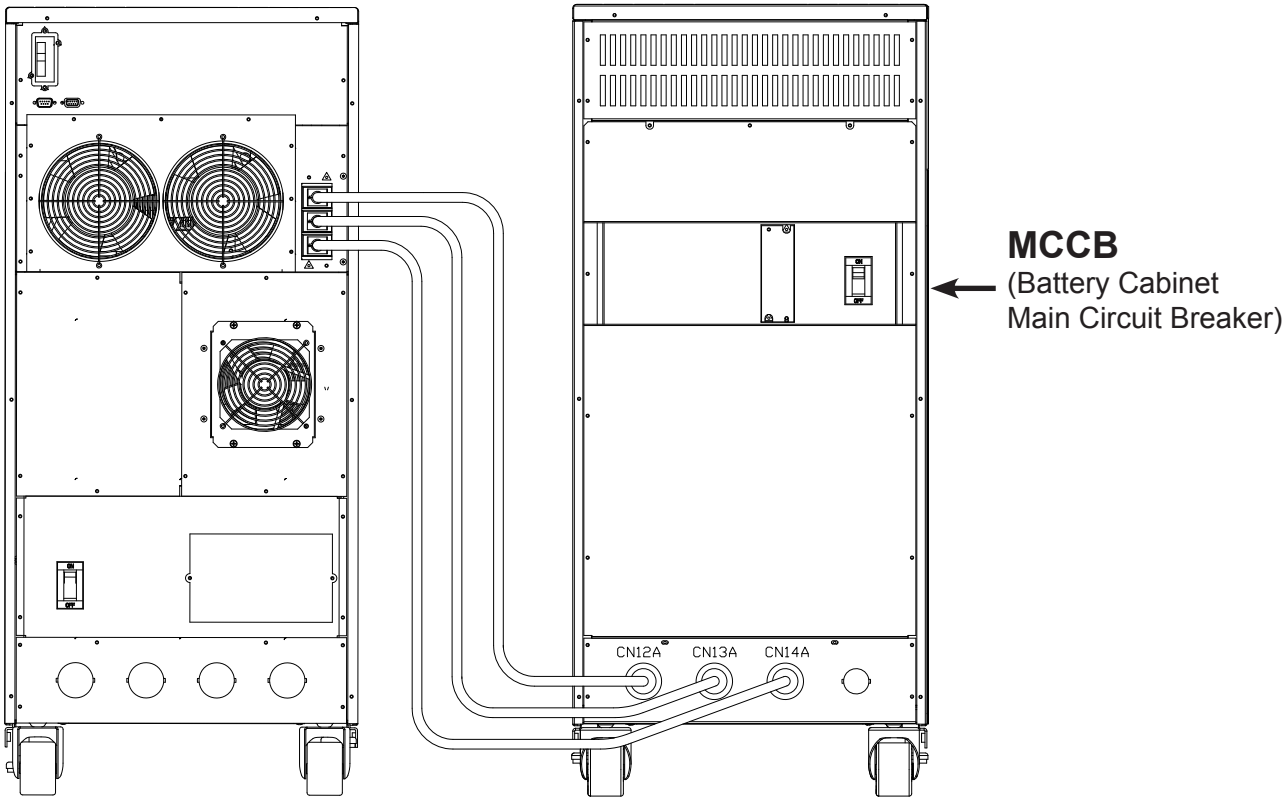
Use the following table to select the recommended wire size and terminal lug tightening torque for I/O wire connections. Use 90 °C copper conductors for all Input, Output, and Ground wiring.

Item	Terminal Number	Cable Size - AWG						Tightening Torque lb.-in. (N•m)
		3.6 kVA	6 kVA	8 kVA	10 kVA	14-18 kVA	22 kVA	
AC Input Lines	1 and 2	10 **(8)**	8 **(8)**	8 **(1/0)**	6 **(1/0)**	4 **(1/0)**	1 **(1/0)**	14.2 (1.56)
AC Output Lines	4, 5, and 7	12 **(8)**	10 **(8)**	8 **(1/0)**	6 **(1/0)**	4 **(1/0)**	1 **(1/0)**	14.2 (1.56)
AC Output Neutral	6	12 **(8)**	10 **(8)**	8 **(1/0)**	6 **(1/0)**	4 **(1/0))**	1 **(1/0)**	14.2 (1.56)
Ground	3 and 8	12 **(8)**	10 **(8)**	8 **(1/0)**	6 **(1/0)**	4 **(1/0))**	1 **(1/0)**	14.2 (1.56)
EPO Switch	14 and 15	16	16	16	16	16	16	9.0 (0.99)
Remote Switch	16 and 17	16	16	16	16	16	16	9.0 (0.99)

Note: Wire size is presented as the recommended size followed by a bold number in () that is the maximum wire size the terminal block can accommodate. See page 64 for knock-out hole sizes on the back of each model.

8.3 Optional Battery Cabinet Connections

Optional external battery cabinets can be used to extend the backup time of the UPS beyond that available with the internal batteries. The external battery cabinets connect to the UPS via Anderson-style connectors.



UPS Model	Battery Cabinet MCCB Capacity
3.6, 6 kVA	50 A
8, 10, 14, 18, 22 kVA	100 A

See the applicable battery cabinet manual for additional details.

9. Product Description

An uninterruptible power system (UPS) is a system that is installed between the commercial power and the load equipment. The UPS provides steady AC output power during commercial power short-term blackouts or brownouts. This power is provided for a sufficient amount of time so that the load can be shut down in an orderly fashion. This prevents loss of data and possible damage to both hardware and software.

During normal operation, the UPS uses commercial AC power. It absorbs all of the high voltage spikes and transients caused by switching and faults, and all of the common-mode and normal mode noise which is associated with commercial AC power. The UPS converts it all to clean DC power. From this power, the UPS charges its batteries and generates its own extremely high quality AC waveform output. The result of this process is maximum power conditioning and regulation.

If the AC power supplied to the UPS drops below a specified voltage level, the unit's batteries automatically begin supplying power instead of receiving it. This insures that the loads connected to the UPS continue to receive power with no interruption. When AC input power becomes available again, operation returns to normal. The unit's batteries begin to recharge so they will be ready for the next power interruption.

9.1 Application and Use

Toshiba 1600XP Series of On-Line UPS provides continuous computer-grade AC power in a compact, high performance, and energy efficient unit. The UPS unit ensures safe and reliable operation of critical office equipment. All units feature an audible alarm which sounds if the battery voltage drops below a specified minimum during use. This is an additional aid to help protect valuable office data banks. All units allow for computer interfacing.

9.2 Output Rating

Toshiba 1600XP Series (208/240V) offers UPS models with the following capacities:

MODEL	Output Capacity @ 240 V	Output kW @ .85PF 240 V
UH3G2L036C61T	3.6 kVA	3.1 kW
UH3G2L060C61T	6 kVA	5.1 kW
UH3G2L080C61T	8 kVA	6.8 kW
UH3G2L100C61T	10 kVA	8.5 kW
UH3G2L140C61T	14 kVA	11.9 kW
UH3G2L180C61T	18 kVA	15.3 kW
UH3G2L220C61T*	22 kVA*	18.7 kW*

All models are RoHS compliant with the batteries being exempt from the directive.
*NOTE: Derate to 18.7 kVA (15.9 kW) for 50 Hz operation.

9.3 Power Backup

When an electrical power failure occurs, the UPS's internal batteries automatically supply back-up power to the load without interruption. For example, when used to support a computer, the UPS back-up assures enough additional time to complete the activity and store the data. This allows an orderly shutdown after a power failure has occurred.

9.4 Power Conditioning

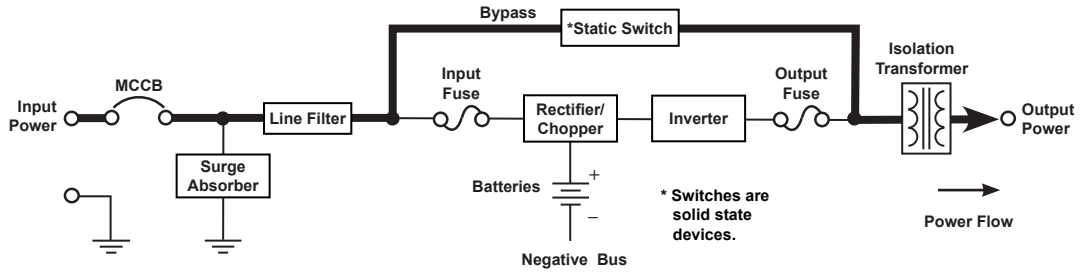
When commercial power is present, the UPS supplies conditioned power to the load while maintaining its batteries in a charged condition. The UPS protects against the normal, everyday problems associated with unreliable commercial power, including power sags, surges, signal interference, and spikes. This protection keeps power-line problems from reaching your load, where they can cause equipment to operate erratically, or damage software and hardware.

10. Operating Modes

10.1 Static-Bypass (Stop operation)

If the UPS unit is severely overloaded or develops an internal fault, power flow is automatically switched from the unit's main circuit to the bypass circuit. Power flow through the bypass is shown in the following illustration. This change-over occurs automatically in phase in less than one-quarter cycle of the input waveform. The switching period is not long enough to cause interruptions to occur in most loads.

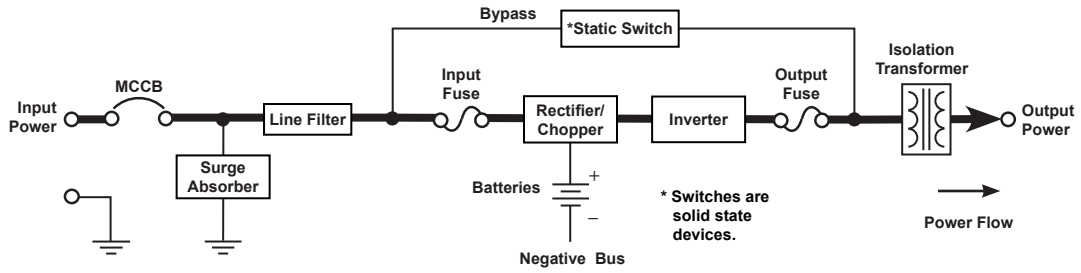
- If the power flow is transferred to the bypass circuit due to an internal fault the UPS will continue to supply power to the load through the bypass and indicate a system fault message (see system fault messages on pages 47–48).
- If the power flow is transferred to the bypass circuit due to an overload condition (see system warning messages on pages 48–49), then the power flow will automatically transfer from the UPS's bypass circuit back to the inverter circuit after removing the overload if set to do so (AutoXfer parameter (Cmd ID 660)).



POWER FLOW IN BYPASS FOR ALL MODELS

10.2 On-Line (Run operation)

The following illustration shows circuit power flow when the UPS is operating normally in the On-Line mode. The UPS rectifier, including a boost chopper circuit, converts AC input power to DC power. The boost chopper circuit maintains a constant voltage, with current limiting, for charging the batteries. The inverter section generates a high quality sinusoidal output voltage. The unit's batteries are always maintained in a constantly charged state when the UPS is in the run operation mode.

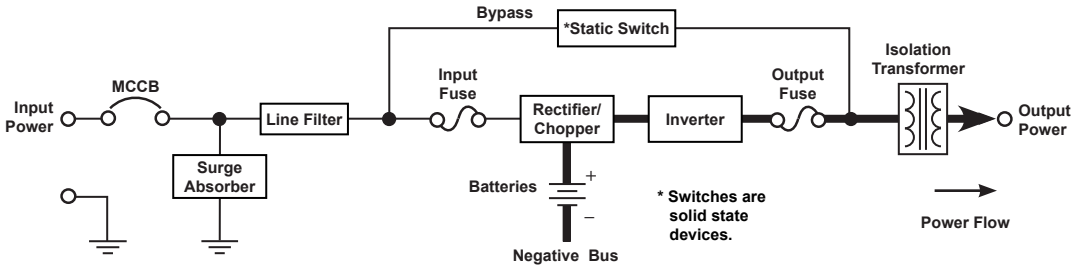


POWER FLOW IN ON-LINE MODE FOR ALL MODELS

10.3 Battery Backup (On batteries)

The following illustration shows power flow during the battery backup mode. When commercial AC power failures occur, the UPS's batteries instantly begin supplying DC voltage to the UPS's main inverter circuit. This circuit changes (inverts) the DC power into AC power. The AC power is available at the output of the unit.

This back-up process will continue until the UPS's battery voltage drops below a specific minimum level. When this occurs, the batteries will stop supplying power to the load. This minimum level is the rated minimum voltage (Vmin). The rated battery voltage chart on page 19 shows (Vmin). The battery backup time and discharge process is explained on page 19.



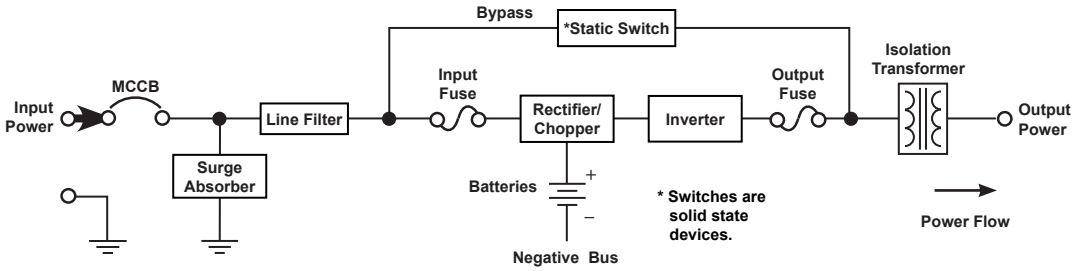
POWER FLOW IN BATTERY BACKUP FOR ALL MODELS

10.4 EPO (Emergency Power Off) Function

These units are equipped with terminals for receiving an emergency power-off (EPO) command via a closed-contact switch at a remote location (see Terminal Block Details on page 11 and terminal block location on pages 60-61). This safety feature enables quick shut-down of the UPS's AC input breaker, output and battery circuits.

Usually the emergency power off switch is installed in a central location that is easily accessible to personnel concerned with the operation of the UPS unit and the load equipment connected to it. The EPO function is initiated by pressing the switch to the closed (shutdown) position.

The effect of using the EPO switch is the same whether the UPS unit is in AC input mode, battery backup mode, or the circuit bypass mode. The following figure shows the UPS condition after application of the EPO switch.

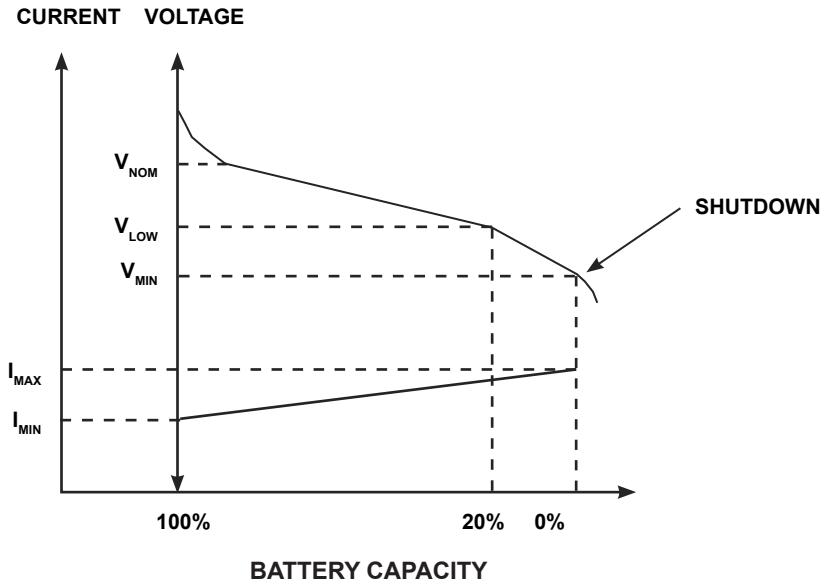


POWER FLOW AFTER AN EPO COMMAND FOR ALL MODELS

10.5 Battery Backup Time and Discharge Process

The UPS batteries provide approximately 5-7 minutes of back-up time depending on the 1600XP unit kVA rating. These times are valid when the unit is operating under full load and at the rated power factor. The exact length of these times will depend on the UPS model used, condition of the batteries, amount and type of load, temperature and other variables. See battery backup time in 'UPS Specifications' beginning on page 53.

The following illustration graphically shows the battery discharge process at full load conditions.



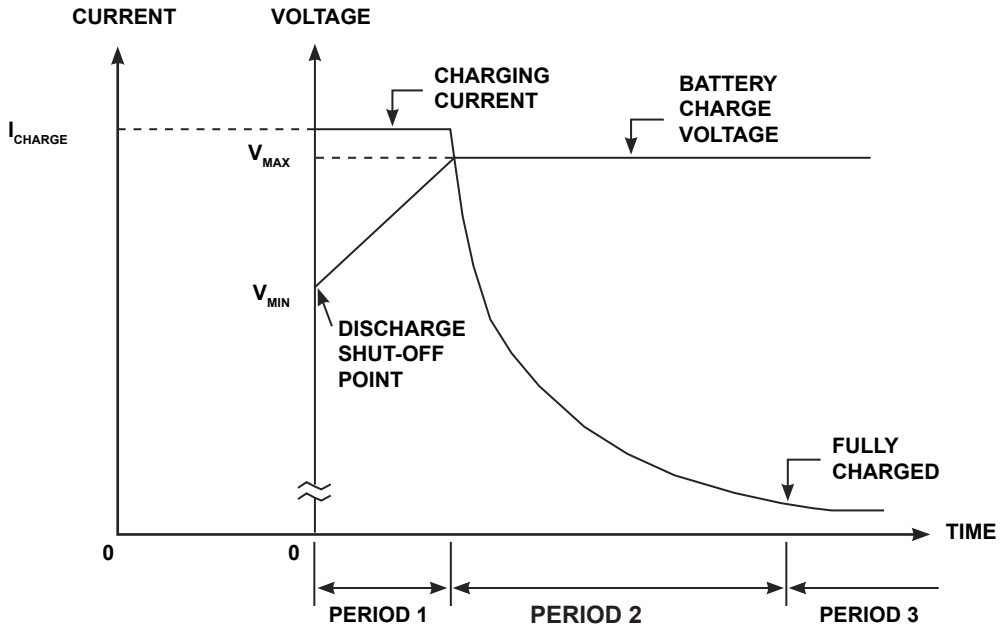
10.6 Battery Low Voltage Tolerances

Excessive discharge will cause the UPS battery voltage to drop. The chart shown below lists the voltage level at which each UPS low-voltage alarm will sound and at what level the low-voltage condition will cause the unit to automatically shut down.

UPS Capacity	3.6 kVA	6 kVA	8 kVA	10 kVA	14 kVA	18 kVA	22 kVA
Nominal voltage (Vnom)	144 Vdc	216 Vdc	288 Vdc	288 Vdc	288 Vdc	288 Vdc	288 Vdc
Alarm voltage (Vlow)	130 Vdc	192 Vdc	246 Vdc	246 Vdc	246 Vdc	246 Vdc	246 Vdc
Shutdown voltage (Vmin)	114 Vdc	170 Vdc	227 Vdc	227 Vdc	227 Vdc	227 Vdc	227 Vdc

10.7 Battery Recharging

The illustration below shows a graphical representation of the UPS battery recharge process after a full discharge.



The recharge process usually consists of three periods. During the first period, the current is maintained at approximately 1 ampere. This current limit is the maximum value that can be used to charge the batteries (for minimal recharge time) while assuring safety and long battery life. In the second period, constant-voltage control starts and current gradually decreases as the batteries charge to their normal fully charged state. In the third period, a slight trickle current continues to flow into the batteries to keep them fully charged and floating at the normal Vdc level. A full recharge usually requires 24 hours (90% recharge in 12 hours) after a complete discharge.

The following chart shows the rated maximum and minimum battery voltages and the charge current for each of the sizes.

RATED BATTERY VOLTAGES

Model	Vmax	Vmin	Icharge
3.6 kVA	163 V	114 V	1.0 A
6 kVA	245.7 V	170 V	1.0 A
8 kVA	327 V	227 V	1.0 A
10 kVA	327 V	227 V	1.0 A
14 kVA	327 V	227 V	1.0 A
18 kVA	327 V	227 V	1.0 A
22 kVA	327 V	227 V	1.0 A

11. Operating the UPS

The 1600XP should be installed by a certified electrician. Once installed, the 1600XP is designed to be operated by any user. Anyone not familiar with this UPS should read the manual before attempting to operate it.

11.1 Initial Startup (First Power-Up)

The first time the UPS is activated after being shipped from the factory, these parameters need to be set by the customer for site specific ratings. Input Rated Voltage, Output Rated Voltage, UPS Date, and UPS Time.

The input frequency defaults to 60 Hz.

The first screen displayed during the initial startup sequence requires the operator to select the nominal Input Voltage. Select from 208V, 230V, or 240V, and press the **Write** key.

If the command has been accepted, the word “Successful” will appear at the bottom left side of the display.

1. Repeat the process in step 1 in selecting the Rated Output Voltage.
2. Use the keypad to type in the current date in the format: *Mon 10/05/2009* and press **Write**.
3. Use the keypad to type in the current time in 12 hour format: *12:15 PM* and press **Write**.
4. The Main screen is now displayed. Verify the UPS is in BYPASS mode. The mode (lower right side of the display) should display **Bypass**. If it does not display **Bypass,** press and momentarily hold the **STOP** button on the Main display.
5. With the UPS in bypass mode, cycle power to the UPS as follows:
   - At the rear of the UPS switch the main circuit breaker MCCB to OFF.
   - Leave the UPS off until the DC bus is safely discharged (approximately 5-10 minutes).
   - Restart the UPS by switching the main circuit breaker ON.

The table below summarizes the initialization parameters:

ID	Command	Options
111	Rated Vin	Select from 208V, 230V, or 240V, and press **Write**.
215	Rated Vout	Select from 208V, 230V, or 240V, and press **Write**.
634	UPS Date	Input the date in this format: *Mon 10/05/2009* and press **Write**.
635	UPS Time	Input the current time in 12 hour format: *12:15 PM* and press **Write**.

11.2 Starting the UPS

Turn the main circuit breaker (MCCB) on the back of the UPS (see pages 60-61) to the **ON** position. The breaker should remain in the **ON** position.

Verify that the **On-Line** LED on the front panel (see page 23) lights green. All LED's on the front panel may light for a moment when the input breaker is turned on. This is normal. The UPS will now be supplying power in the On-Line mode. If the On-Line LED is not illuminated push and hold the RUN key for approximately 3 seconds.

NOTICE

When running the UPS for the first time charge the batteries for at least 24 hours (input breaker on) before operating the connected load. Failure to do so will result in reduced battery backup time.

11.3 Stopping the UPS

To stop the UPS press and hold the **STOP** key approximately 3 seconds until the **On-Line** LED changes from green to off (audible beep). The UPS is now in the bypass mode.

NOTICE

If the input breaker is turned off while UPS is in the bypass mode, the output power stops. Any load devices will lose power.

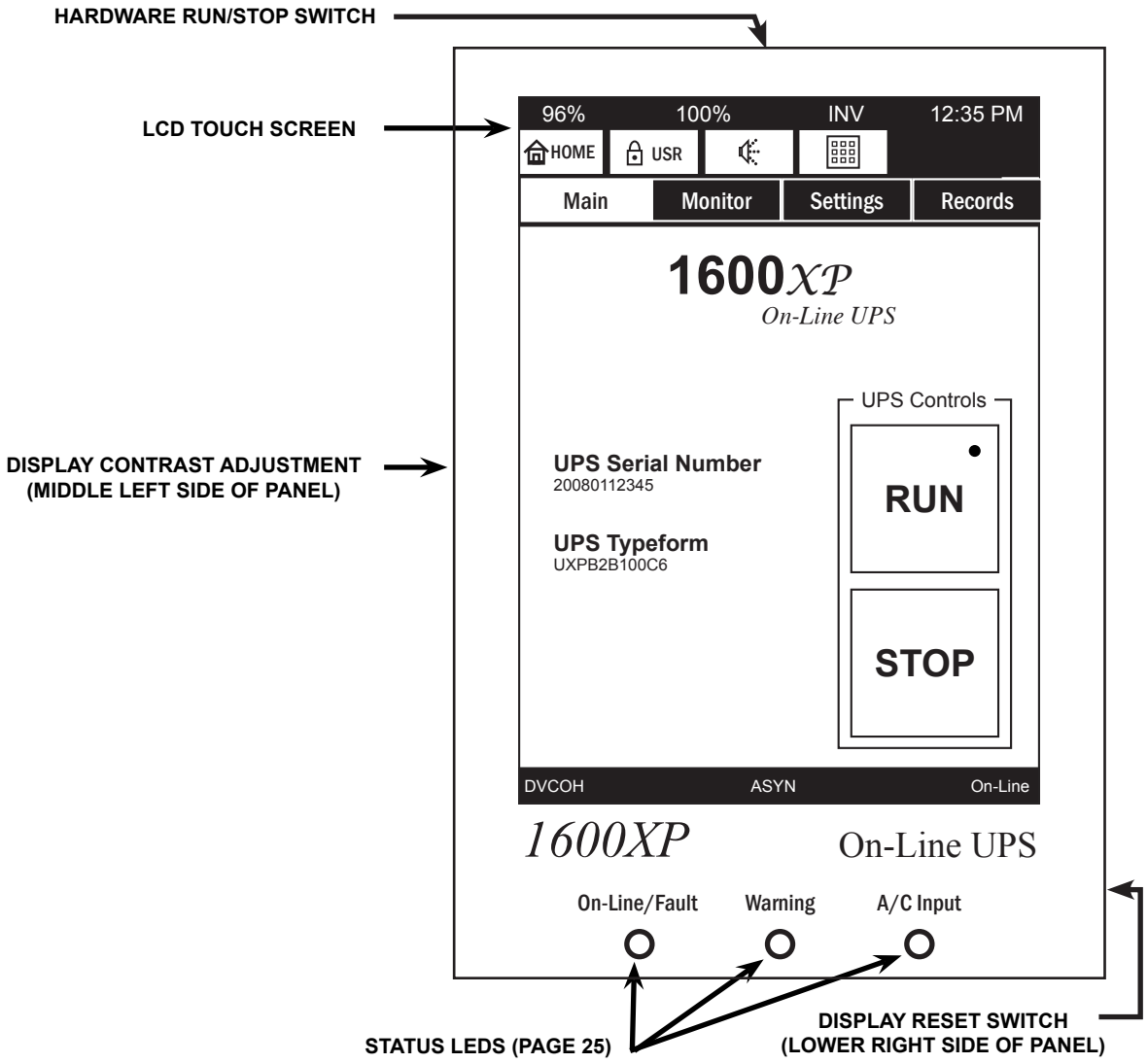
Ensure that all sensitive loads have been previously shut down.

To completely stop the UPS, turn the input breaker at the back of the UPS to the **OFF** position.

12. Display and Keys

12.1 Front Panel Layout

The front panel consists of several elements for monitoring and operation of the UPS. Panel components are shown in the illustration below:



12.2 Display Manual Controls

Hardware Run/Stop Switch – Pressing the contact switch momentarily will toggle the UPS state between RUN and Bypass. For Instance, while the UPS is in RUN mode, pressing the switch will change the mode to Bypass. Pressing the switch again will switch the UPS back to RUN mode.

Display Reset Switch – When necessary, the touchscreen display can be reset by using a thin probe, such as a paper clip, to press the display reset switch.

Display Contrast Adjustment – The display is shipped with the display adjusted for optimum visibility. If necessary use a trimmer adjustment tool to fine tune the display contrast for improved visibility.

13. LCD Touchscreen Layout

The touchscreen serves as input and display. Touch the active portion of the display to execute a command.

13.1 Startup Display

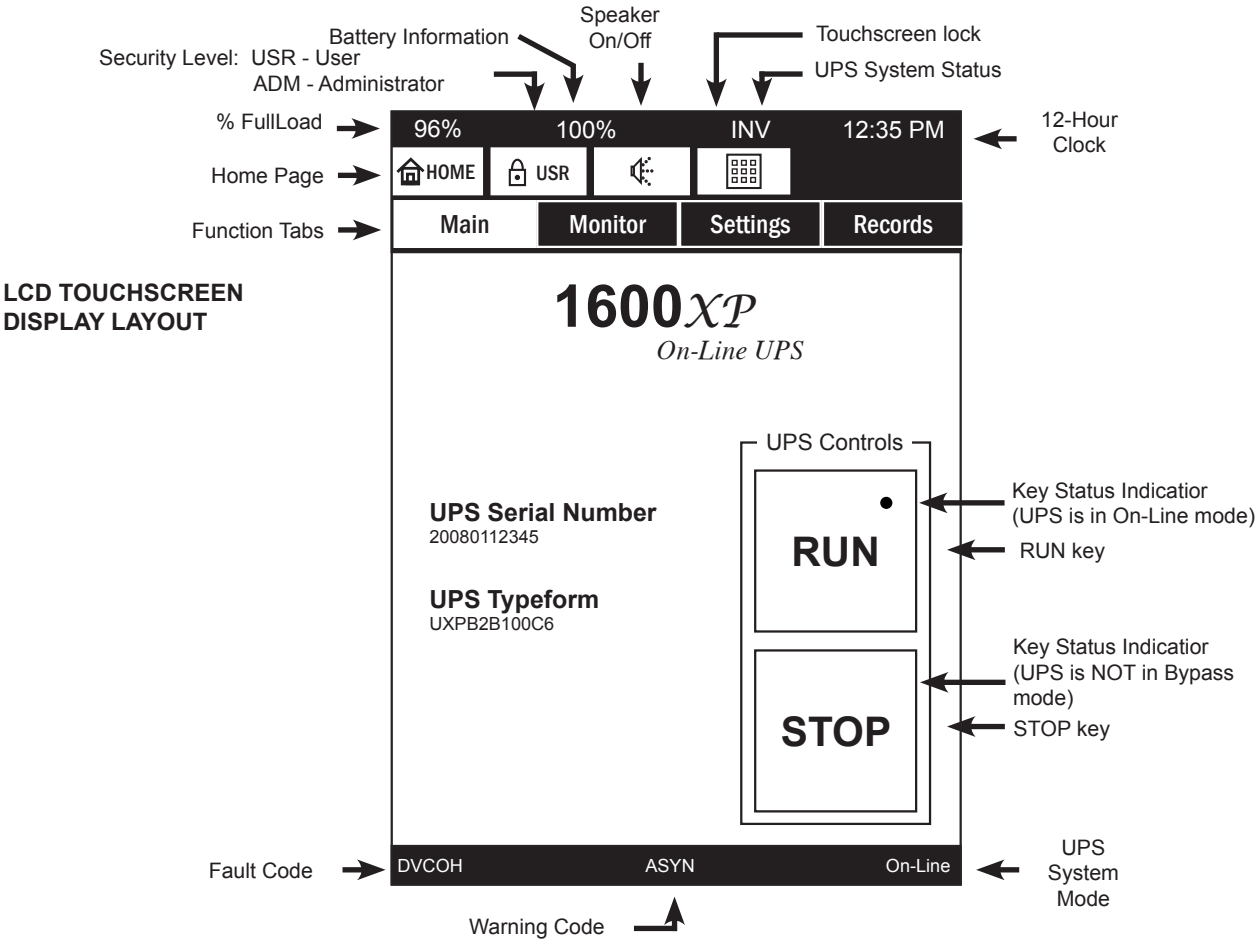
The default opening screen for the UPS is the **Main** screen. The operator can begin operating the UPS immediately by pressing the RUN key.

Only the **Main** and **Settings** tab screens allow operator input. The **Monitor** and **Records** display screens are read-only. No data can be entered in these screens

From the **Main** screen, the UPS can be placed On-Line by pressing RUN, or placed in Bypass Mode by pressing STOP.

The **Settings** screen allows modification of the UPS operating parameters.

At the top of the display are four status indicators: % Load, Battery Information, UPS System Status, and System Time.



At the top left of the display are a bank of four touch-sensitive keys:

Home - Pressing **HOME** key returns the display to the top menu of the currently selected tab.
Security Level - Pressing the **Security Leve**l key activates the log-in security screen.
(Speaker) - Pressing the **Speaker** key will disable/enable the audible alarm.
Touchscreen Lock - Locks touchscreen except for this key.

The second row of keys are the function tabs.
At the bottom of the display three event codes display the latest operational information: Faults, Warnings, and the current UPS System Mode. (See pages 47–51.)

13.2 Operating Keys

The icons listed in the table below identify the touch-sensitive keys on the main touchscreen. The keys are different types of controls that can be activated by pressing that area of the touchscreen.

Key	Functional Description
RUN ▸ RUN	Run Key - Press and hold the key 1-2 seconds (until the UPS 'beeps') to put the UPS in On-line mode. The active status indicator (upper left dot) will appear on the RUN key and disappear from the STOP key.
STOP ▸ STOP	Stop Key - Press and hold the key 1-2 seconds (until the UPS 'beeps') to put the UPS in Bypass mode. The active status indicator (upper left dot) will appear on the STOP key and disappear from the RUN key.
HOME	Home Key - Press to return to top menu of respective tab.
USR	Security Level Key. Press to open security login screen.
	Event Alarm Mute Key- Press to silence current event alarm. Alarm Muted Key- Alarm remains silenced until next event.
	Touchscreen Enabled Key- Press to disable (lockout) all touchscreen keys except this key. Touchscreen Disabled Key - Press to enable (un-lock) touchscreen.
Main Monitor Settings Records	Four function tab keys: Main, Monitor, Settings, Records Main - Start and Stop keys, UPS Serial number and typeform. Monitor - Shows Mimic display for accessing Input/Output/Bypass/Battery data. Settings - Provides access to adjustable performance parameters. Records - Access fault, warning and other records.
	As displayed on: **Monitor and Settings** screens: << < BAT 2 / 3 > >> **Records** screens: << < 2 / 3 > >>
<<	Go To First Page/Record Key.
<	Go to Previous Page/Record Key.
BAT	Menu selection under Monitor and Settings tabs.
2 / 3	Shows the current page or record number, and total number of pages or records.
>	Go to Next Page/Record Key.
>>	Go To Last Page/Record Key.

13.3 Status Indicators

The four top and three bottom UPS status Indicators on the main screen and their meanings are listed in the table below.

Indicator	Functional Description
96%	Shows the current load percentage.
100% / 11' 100% / 9' 35" 100% / N/A	Battery Information: In On-line and Battery Back-up mode the display alternates between battery charge percentage and estimated remaining battery runtime in: Minutes for Runtimes > 10 min. Minutes and Seconds for Runtimes < 10 min. In other modes, the display alternates between battery charge percentage and "N/A."
INV	Shows current UPS Status. Indicator will change as the UPS status changes. For a detailed listing see page 50.
12:35 PM	System Time
DVCOH	Fault Description Code - For a detailed listing see 47.
ASYN	Warning Description Code - For a detailed listing see page 48.
On-Line	Current operating mode of the UPS - For a detailed listing see page 50.

13.4 Light Emitting Diodes (LED)

The following table describes the front panel LED behaviors and the associated meaning.

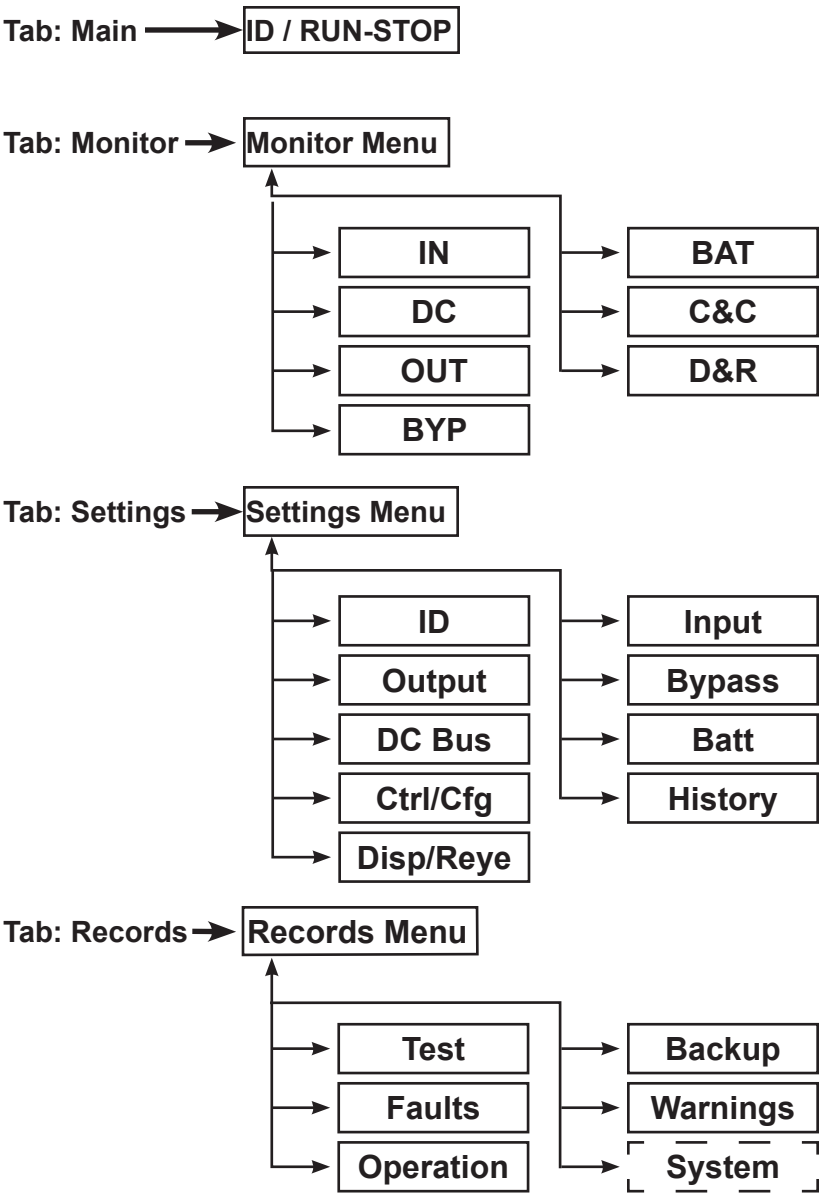
LED	Behavior	Significance/Meaning
○ On-Line/ Fault	Green - ON	UPS is in On-Line, Backup, or Battery Test mode.
	Green - OFF	UPS in Bypass mode.
	Green - OFF	Load Discharging
	Red - ON	One or more faults occurred. See *Records: Faults* for details.
	Red - Flashing	Charger overvoltage occurred.
	Red - OFF	No fault occurred.
○ Warning	Amber - ON	Service Call needed, **Less than 6 mo. of Battery Life** or **Battery Life End**.
	Amber - Flashing	One or more Warnings occurred. See *Records: Warnings* for details.
	Amber - OFF	No Warning (Normal, UPS in operation).
○ AC Input	Green - ON	Input voltage is within specified range.
	Green - Flashing	Input voltage is over specified range.
	Green - OFF	Input voltage is under specified range.

NOTE: On-Line/Fault LEDs - Appear Amber if Green and Red flash concurrently.

14. Touchscreen Menu Tree

14.1 Front Panel Layout

The diagram below shows the menu tree for the touchscreen display. The four folder tabs and their associated sub-menu choices are shown on the left, and a description of the displays /choices are detailed on the right.



MAIN – Displays the starting screen. It has a **RUN** and **STOP** key that place the UPS in In-Line or Bypass mode respectively.

MONITOR – Graphically displays the current status of the UPS (On-Line, Backup, Bypass, Shutdown) in an interactive power flow block diagram. Selecting one of the blocks provides additional detailed data of the Input (**IN**), Output (**OUT**), Bypass (**BYP**), Battery (**BAT**), and DC Bus (**DC**), Control & Configuration (**C&C**), and Display & External (**D&E**) devices.

SETTINGS – Allows monitoring and/or modification of UPS parameters. Parameters that can be viewed or modified vary depending on the security level of the login password entered using keypad.

Records – Displays the most recent 32 **Test**, **Backup**, **Faults**, **Warning**, **Operation**, and **System** change records.

System records are only available at the distributor and depot security levels.

In any record set, if more than 32 incidences have occurred, only the most recent 32 record are retained in each report.

14.2 Keypad Controls

The keypad uses a alphanumeric format similar to that used on telephone 12-key keypad. Rapidly press a key 1 to 5 times to select the desired character.

For instance, quickly press the **7PQRS** key four times to enter an "R."

Pause a moment, then key in the next value.

Press the backspace key to delete the last character entered.

The keypad can be toggled to access to lower case letters and the space " " key by pressing the **Shift** key. Enter the lower case letters as above.

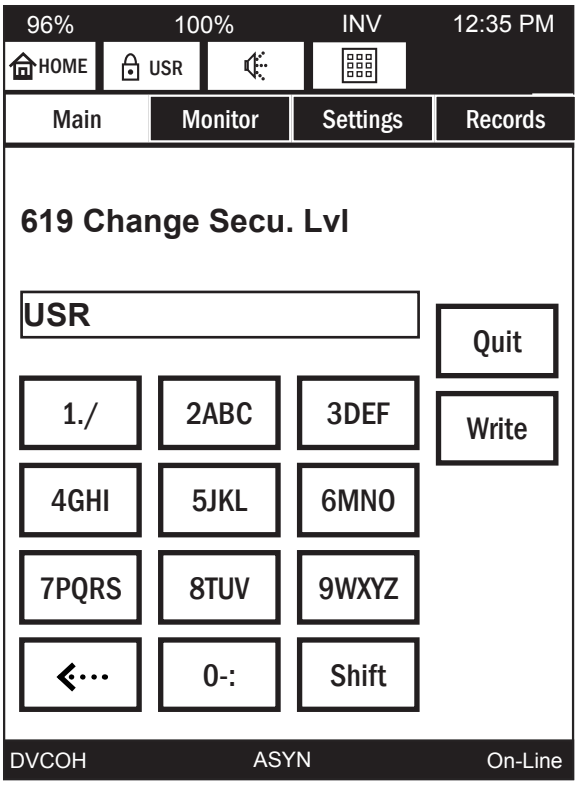
The Space key is used to enter a space between alphanumeric characters.

Example: By using the additional characters available with the shift key you can type in a device name:

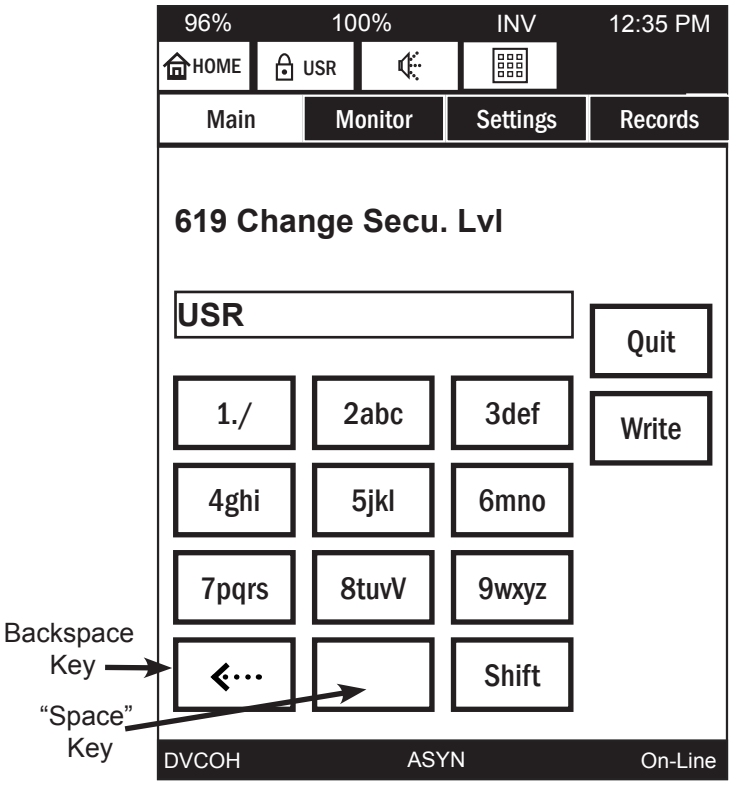
"Toshiba H3" instead of "TOSHIBAH3"

Return to the Upper Case format keypad by pressing **Shift** again.

Exit the keypad display by pressing either the **Quit** or **Write** key.



KEYPAD



SHIFTED KEYPAD

14.3 Screen: Security Passwords & Keypad

The UPS has several levels of security password available: USER (USR) , ADMIN (ADM), and other security levels for use by service and factory representatives.

The security level is indicated on the Security Key.

The UPS stays in a security level until a new level is entered.

For example, once the UPS is placed in the USR level, it remains at that level until the security level is changed.

Login:

1. Press the **Security Level** key, [USR].
2. The keypad replaces the Main screen to allow entering the password. By default the password are set to:

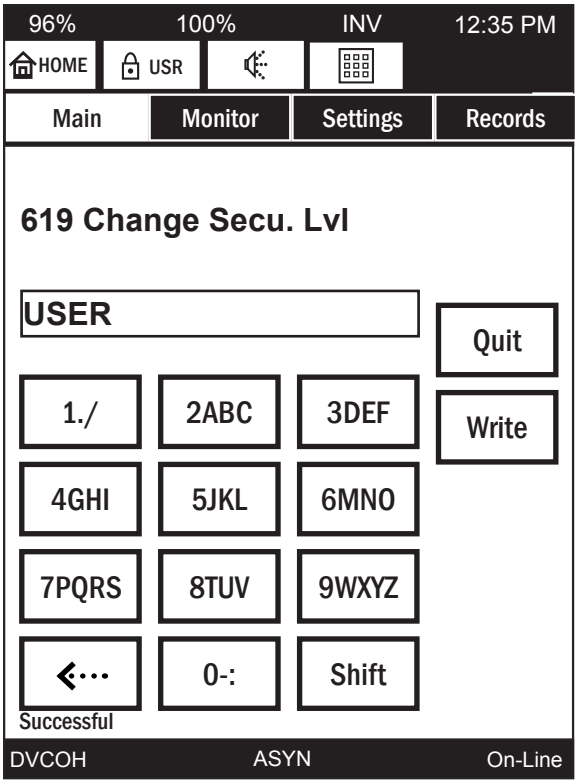
   User: USER

   Administrator: ADMIN
3. Typing in USER in the keypad will change the security level to User. Enter the password using the alphanumeric keys.
4. Press **Write** to store the password in the UPS. If the password is accepted the text “Successful” will display at the bottom left of the touchpad, as shown here.

If the password entered was not accepted, the text “Error15 – Write Function” or some similar message will indicate that the password or level change was not accepted.

5. Press the **QUIT** key and the keypad will close and the original display restored.

This same keypad is used for data input for parameters in the Settings tab.

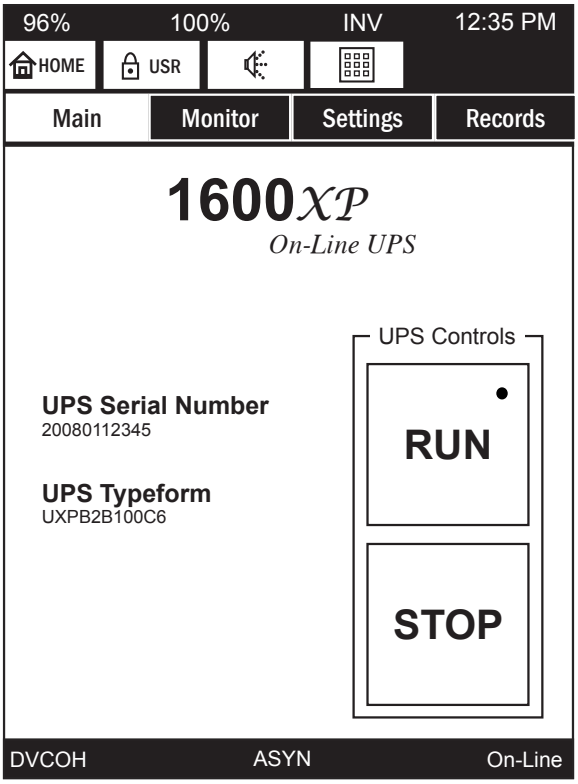


KEYPAD

15. Screen Tab: Main

The Main tab is also the opening tab on startup for the UPS. Press **RUN** to place the UPS in On-Line mode, and press **STOP** to place the UPS in Bypass mode.

RUN/Stop the UPS
Press and momentarily hold (approximately one to two seconds) the **RUN** or **STOP** key to place the UPS in On-Line or Bypass mode respectively.



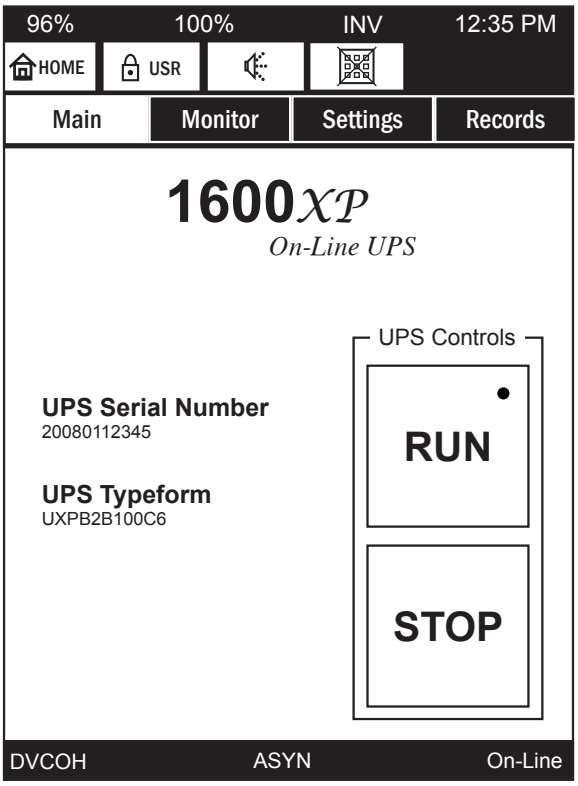
MAIN SCREEN

The touchscreen display can be disabled for safety or convenience by pressing the touchscreen lockout key, .

(NOTE: The touchscreen lockout key is disabled when the screen is in keypad mode.)

The Lockout key will change to and the touch-screen will not respond to any input except a touch to the lockout key.

Touching the lockout key again will toggle the lockout off, the graphic will change to indicating the touch-screen is active.



MAIN SCREEN DISABLED

16. Screen Tab: Monitor

The top screen under the Monitor tab is a graphical power flow block diagram that acts as a mimic display showing power flow through the UPS sections (Input, Output, Bypass, and Battery) and the UPS status (On-Line, Backup, Bypass, Shutdown). Additional information screens are available that display the detailed status of the various parameters for the Input, Output, Bypass, Battery, DC Bus, System Status, and Remote Communications.

The Monitor Tab illustration, next page, shows the screens available and how to navigate between them.

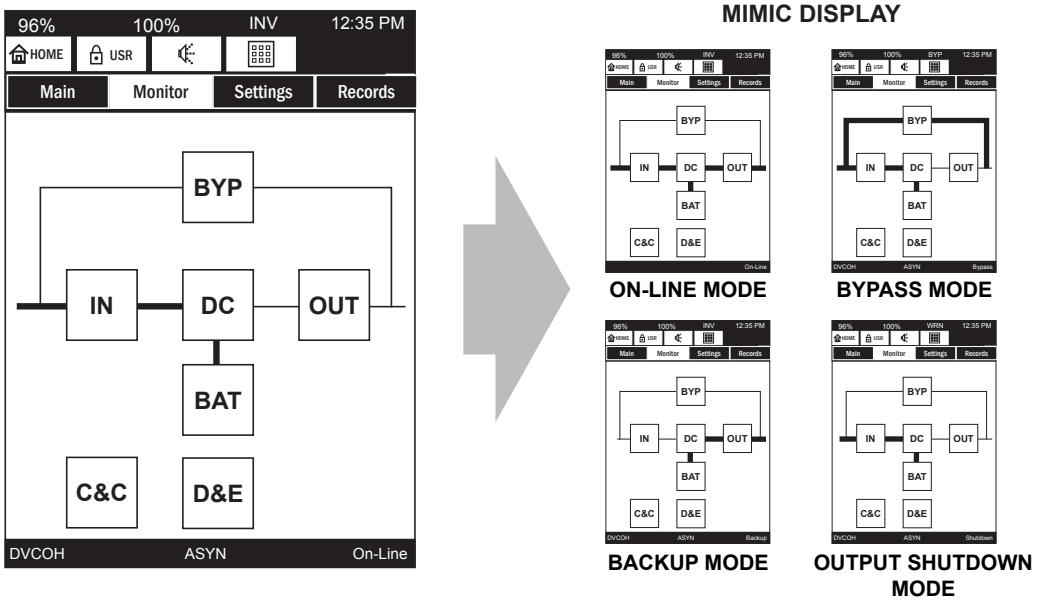
Mimic Display
In the mimic display of the Monitor Tab screen, the four UPS selection keys, Input (**IN**), DC Bus (**DC**), Output (**OUT**), Bypass (**BYP**), and Battery (**BAT**) are connected by lines indicating power flow. A thick line indicates power flowing, and thin line indicates no power flowing.

The Monitor display, below, shows the UPS in Shutdown Mode: Power is flowing to charge the battery, but no power is going to the Bypass or Output.

Monitor Details
Press the **IN**, **BYP**, **OUT**, **DC**, or **BAT** key on the mimic display to view the parameter details for that section of the UPS.

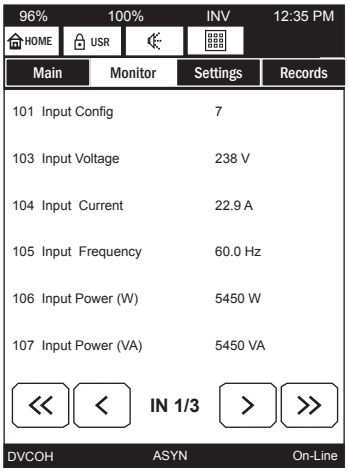
The MONITOR TAB figure on the following page shows the relationship of the various data displays.

Press the Home key, Home, to return to the opening Monitor Tab screen.

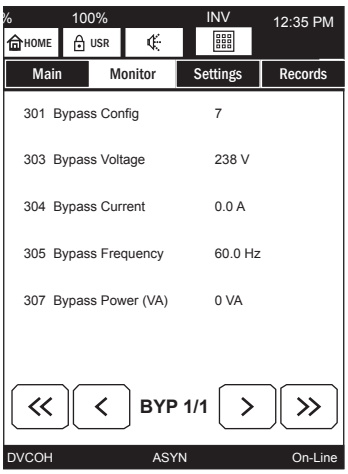


MONITOR TAB

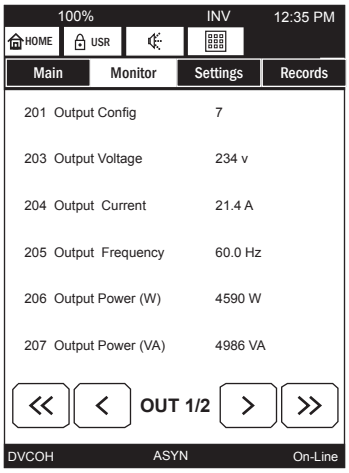
IN


96% 100% INV 12:35 PM
HOME USR
Main Monitor Settings Records
101 Input Config 7
103 Input Voltage 238 V
104 Input Current 22.9 A
105 Input Frequency 60.0 Hz
106 Input Power (W) 5450 W
107 Input Power (VA) 5450 VA
IN 1/3
DVCOH ASYN On-Line

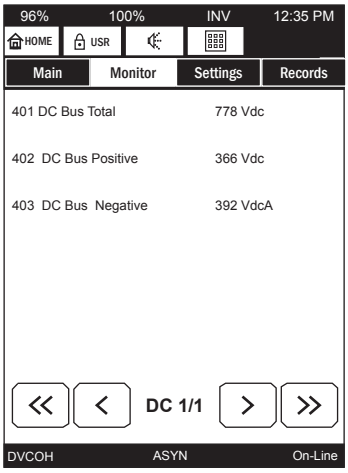
BYP

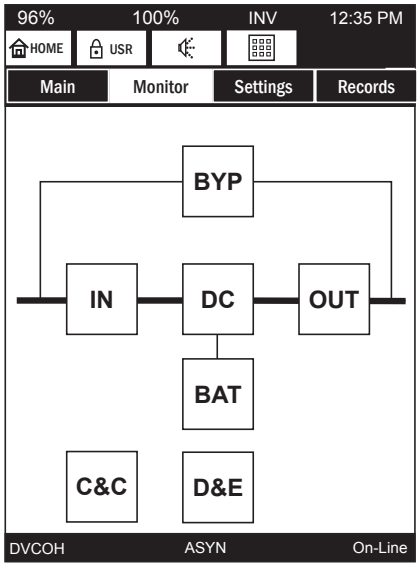

100% INV 12:35 PM
HOME USR
Main Monitor Settings Records
301 Bypass Config 7
303 Bypass Voltage 238 V
304 Bypass Current 0.0 A
305 Bypass Frequency 60.0 Hz
307 Bypass Power (VA) 0 VA
BYP 1/1
DVCOH ASYN On-Line

OUT

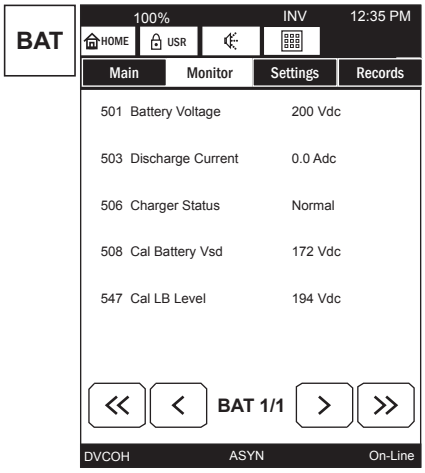

100% INV 12:35 PM
HOME USR
Main Monitor Settings Records
201 Output Config 7
203 Output Voltage 234 v
204 Output Current 21.4 A
205 Output Frequency 60.0 Hz
206 Output Power (W) 4590 W
207 Output Power (VA) 4986 VA
OUT 1/2
DVCOH ASYN On-Line

DC

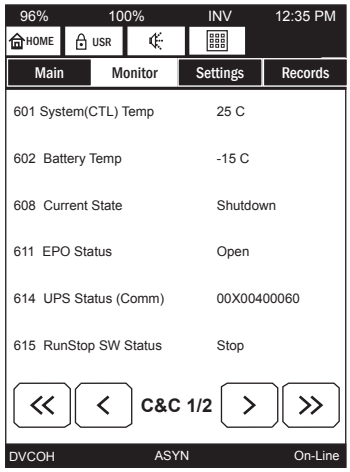

96% 100% INV 12:35 PM
HOME USR
Main Monitor Settings Records
401 DC Bus Total 778 Vdc
402 DC Bus Positive 366 Vdc
403 DC Bus Negative 392 VdcA
DC 1/1
DVCOH ASYN On-Line



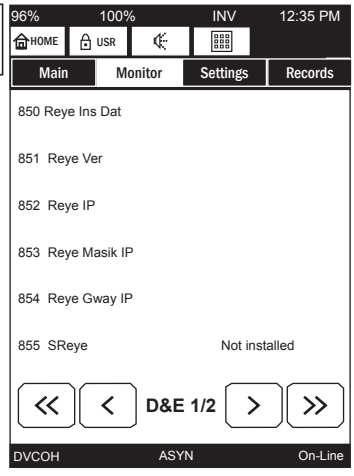
BAT


100% INV 12:35 PM
HOME USR
Main Monitor Settings Records
501 Battery Voltage 200 Vdc
503 Discharge Current 0.0 Adc
506 Charger Status Normal
508 Cal Battery Vsd 172 Vdc
547 Cal LB Level 194 Vdc
BAT 1/1
DVCOH ASYN On-Line

C&C


96% 100% INV 12:35 PM
HOME USR
Main Monitor Settings Records
601 System(CTL) Temp 25 C
602 Battery Temp -15 C
608 Current State Shutdown
611 EPO Status Open
614 UPS Status (Comm) 00X00400060
615 RunStop SW Status Stop
C&C 1/2
DVCOH ASYN On-Line

D&E



MIMIC DISPLAY

Press any key on the mimic display (**IN**, **DC**, **OUT**, **BYP**, **BAT**, **C&C**, **D&E**) to display the associated parameters.

16.1 Records

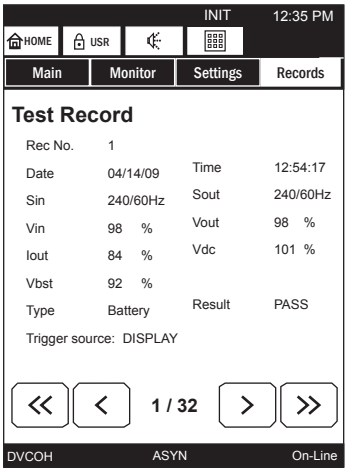
If the selected Record buffer has no records, the display will return the message “NO RECORD.”

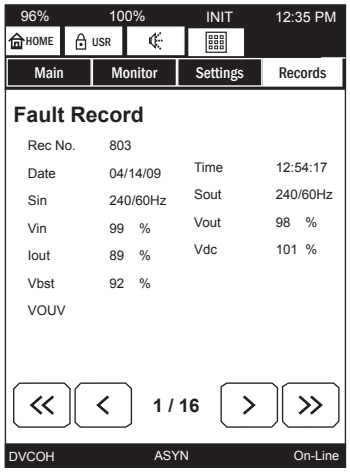
Each record file can be accessed by pressing the labeled key, and the records paged through using the standard next record, previous record, first record, and last record control keys at the bottom of the touchscreen. (See page 24.)

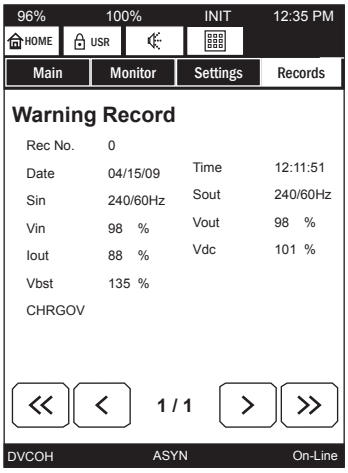
Samples of the five record screens and the data they record are shown below.

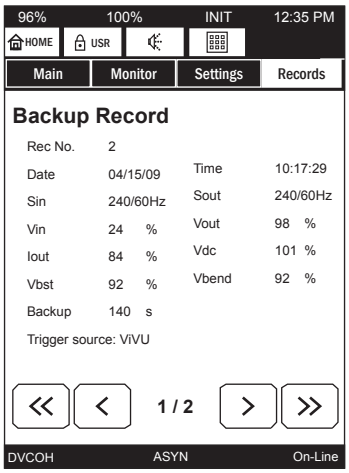
EMPTY BUFFER SCREEN

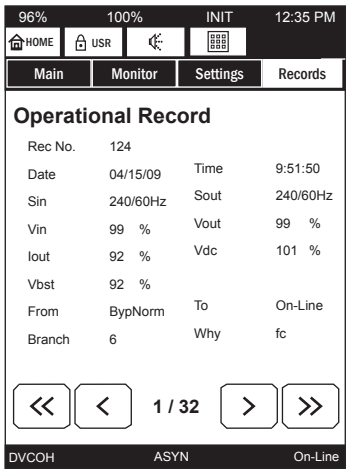
SAMPLE RECORD SCREENS







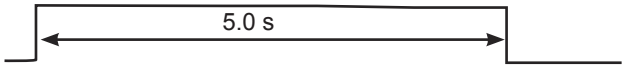
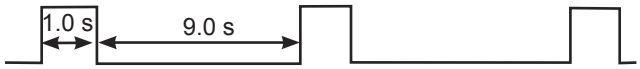
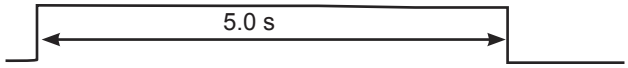
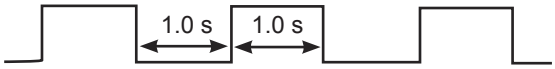
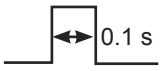




16.2 Audible Alarm Functions

An audible alarm (buzzer) will sound when the UPS is in the battery backup mode, has a fault, has low battery voltage, or is in an overload condition. The buzzer will also beep each time an effective item is touched on the touchscreen. The following chart shows the buzzer pattern durations for each condition. Time units are shown in seconds.

AUDIBLE ALARMS

Condition	Audible Pattern
Any Fault (Interrmittant buzz until fault clears)	
Switch to Backup (Single five-second buzz)	
Backup Operation (Intermittant buzz once every ten seconds)	
UPS Battery Shutdown Voltage (Batt. Voltage 79%)	
Warnings: OL110 (Overload Timer) LB (Low Battery - Batt. Voltage 90%) BLFN (Battery Life Pre-alarm - Batt exp in 6 mo.) BLFE (Battery Life End) CHRGOV (Charger Over Voltage) BTSTFL (Battery Test Fail) BOH (Battery Overheat) AOH (Ambient Overheat) CLMT (Current Limit) DCER (Display Disconnected) BDEPL (Battery Depletion)	
Touching Effective Item on Touchscreen	

The buzzer can be silenced by selecting the Settings tab, then set the Mute Enable parameter to 1. This will turn off the buzzer for the current alarm status, but the buzzer will still sound when the next Fault/ Warning condition occurs.

The buzzer can be disabled by selecting the Settings tab then setting the Mbuzzer parameter to 0. This will disable the alarm so that no alarm sounds for any Fault or Warning condition.

17. Screen Tab: Settings

The tables on pages A1 - A14 list the 1600XP Settings parameters that can be viewed in the MONITOR tab.

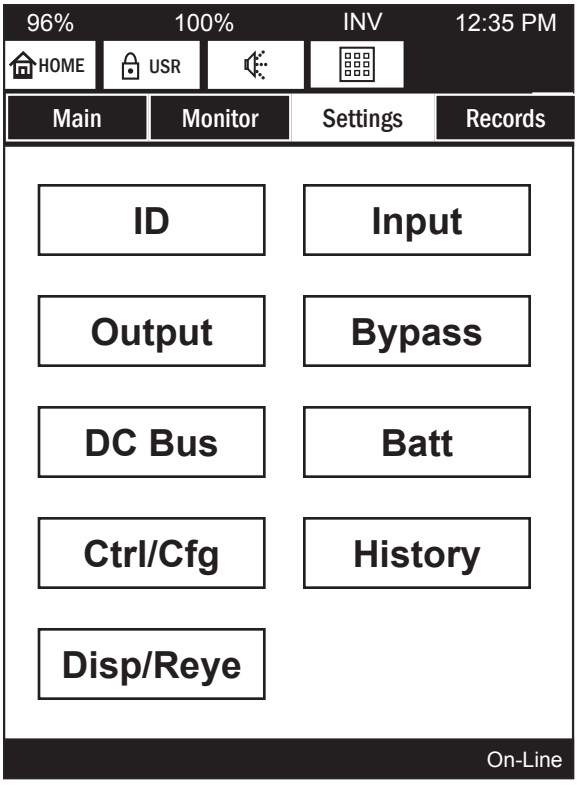
Example: The Settings parameter **Batt Test Freq** (Battery Test Frequency) can be viewed by USR (User) level and above, only logged in ADM (Administrators) and above can edit the value.

Each key displays a block of relevant command parameters:

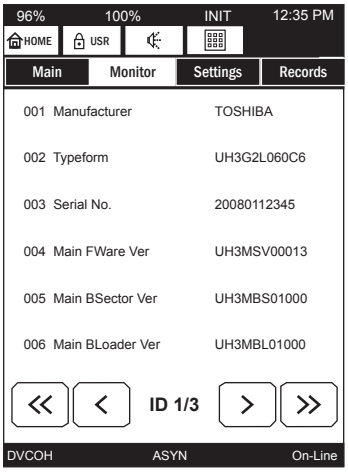
Key – (Cmd ID range) Types of Parameters

- **ID –** (000-099) UPS specific information such as serial number, software versions, installation date.
- **Input –** (100-199) Input measured/calculated data such as input voltage, frequency, current, power, over-/under- voltage settings.
- **Output –** (200-299) Output measured/calculated data such as output voltage, frequency, current, power, over-/under- voltage settings.
- **Bypass –** (300-399) Bypass data such as configuration, voltage, current, power, OV detection level.
- **DC Bus –** (400-499) Data such as Total voltage, rated voltage, Positive and Negative bus voltages.
- **Batt –** (500-599) Battery voltage, charger status, total discharges, shutdown voltage.
- **Ctrl/Cfg –** (600-699) Control and configuration list system and battery temperatures, system status, startup delay, auto-transfer window, restart mode.
- **History –** (700-799) History lists metrics like system operation time, total over loads, hi system temp.
- **Disp/Reye –** (800-849) Display specific parameters like Disp. Firmware version, sleep timer, buzzer status, display calibration points, and RemotEye III settings.

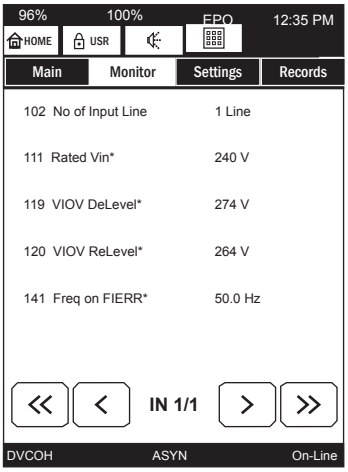
  (850-859) lists RemotEye III IP address, IP Mask, Status, Baud Rate, datalink status.



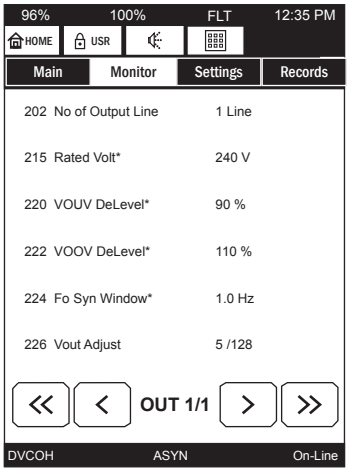
SETTINGS OPENING SCREEN



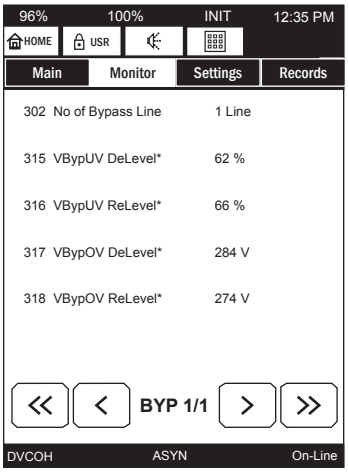
ID BLOCK


96% 100% EPO 12:35 PM
HOME USR
Main Monitor Settings Records
102 No of Input Line 1 Line
111 Rated Vin* 240 V
119 VIOV DeLevel* 274 V
120 VIOV ReLevel* 264 V
141 Freq on FIERR* 50.0 Hz
IN 1/1
DVCOH ASYN On-Line

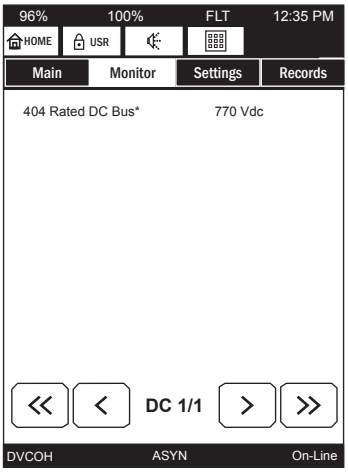
INPUT BLOCK


96% 100% FLT 12:35 PM
HOME USR
Main Monitor Settings Records
202 No of Output Line 1 Line
215 Rated Volt* 240 V
220 VOUV DeLevel* 90 %
222 VOOV DeLevel* 110 %
224 Fo Syn Window* 1.0 Hz
226 Vout Adjust 5 /128
OUT 1/1
DVCOH ASYN On-Line

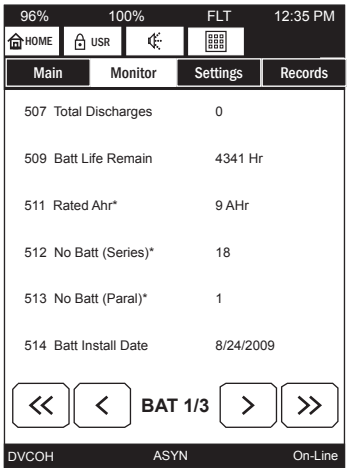
OUTPUT BLOCK


96% 100% INIT 12:35 PM
HOME USR
Main Monitor Settings Records
302 No of Bypass Line 1 Line
315 VBypUV DeLevel* 62 %
316 VBypUV ReLevel* 66 %
317 VBypOV DeLevel* 284 V
318 VBypOV ReLevel* 274 V
BYP 1/1
DVCOH ASYN On-Line

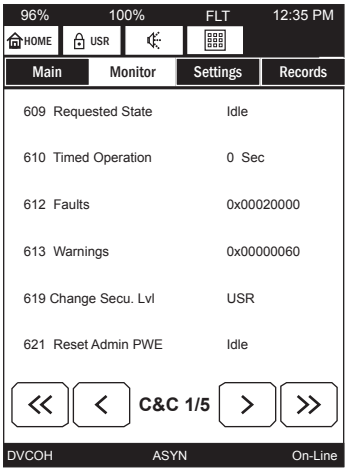
BYPASS BLOCK



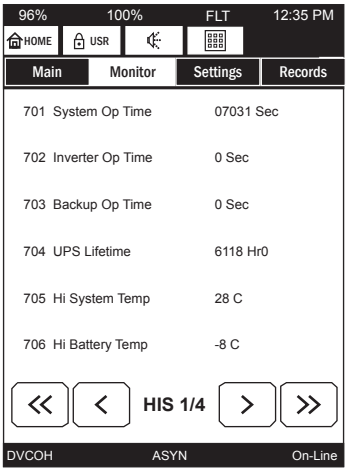
DC BUS BLOCK


96% 100% FLT 12:35 PM
HOME USR
Main Monitor Settings Records
507 Total Discharges 0
509 Batt Life Remain 4341 Hr
511 Rated Ahr* 9 AHr
512 No Batt (Series)* 18
513 No Batt (Paral)* 1
514 Batt Install Date 8/24/2009
BAT 1/3
DVCOH ASYN On-Line

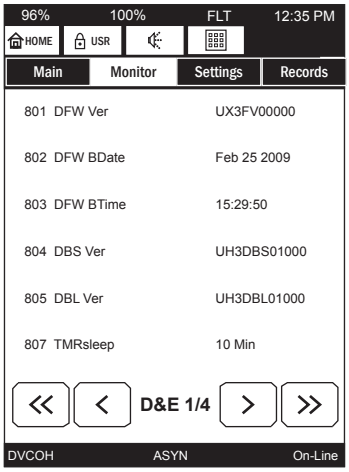
BATT BLOCK



CTRL/CFG (SCC)BLOCK


96% 100% FLT 12:35 PM
HOME USR
Main Monitor Settings Records
701 System Op Time 07031 Sec
702 Inverter Op Time 0 Sec
703 Backup Op Time 0 Sec
704 UPS Lifetime 6118 Hr0
705 Hi System Temp 28 C
706 Hi Battery Temp -8 C
HIS 1/4
DVCOH ASYN On-Line

HISTORY BLOCK



DISP/REYE BLOCK

17.1 Changing UPS Parameter Settings

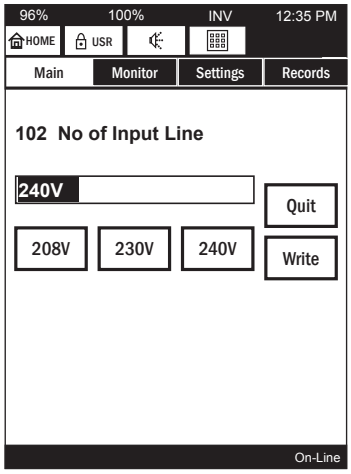
Press the parameter to be changed and the display will open with an appropriate data entry screen. Settings that cannot be changed will respond with “Item cannot be changed” shown at the bottom of this page.

Some parameters will display one of a set of fixed values, such as example 1.

Example 1:

The UPS can have either one or two input lines. The value displayed in the Active Value box is the parameter in use. Alternate values are displayed in keys below the Active Value box.

After selecting the parameter value, press **Write** to write the entered value to the UPS memory and return to the original parameter screen.



Some parameters can be any of a range of values, such as Rated Voltage In example 2.

Example 2:

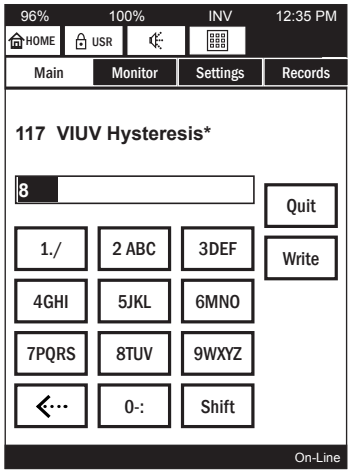
The Rated Voltage In can vary over a range. Press the “Rated Vin” parameter listing and enter the correct value in the Active Value box. using the standard alphanumeric keypad.

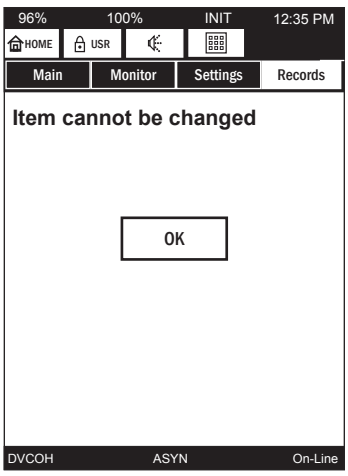
Use the back arrow to delete an incorrect keystroke.

After changing the parameter value, press **Write** to write the entered value to the UPS memory.

Some parameters are informational, some can be changed by the user, and others can only be changed by a higher security access. If a parameter cannot be changed under the current security access level, selecting the parameter for change will generate the message **“Item cannot be changed”**.

Press **OK** to return to the original display.





17.2 Settings Parameters

The following table lists parameters parameters that can be viewed under the MONITOR tab of the touch-screen display.

The security levels are, from lowest to highest level:

Access Level	Sec. Abbreviation
User	USR
Administrator	ADM

The table headings are:

- **Cmd ID** - Command ID number. A three digit number between 000 and 999. Not all numbers have an associated parameter.
- **Description on LCD** - Display text, often abbreviated.
- **Brief Description** - Brief description of the function of the parameter.
- **Location Map - Tab/Blk** - Gives the menu location for the parameter by Tab and Block.
  The tabs are Main, Monitor, Settings, Records.
  E.g. Cmd 501 (Battery Voltage can be viewed under the Monitor tab, in the BATT block)
  UPS Status is displayed in the display header Status field.
  UPS Faults and Warnings are shown in the display footer, at the bottom of the display.
- **Example** - Shows an example of the parameter displayed on the touchscreen.
- **Rqd Security Level to Change/By** - The required security level to change a parameters value or setting: User, Administrator, Distributor.

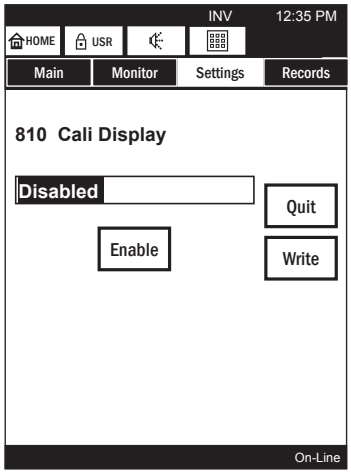
17.3 Recalibrate the Touchscreen

The touchscreen on the UPS is shipped from the factory already calibrated. However, at some point the touchscreen calibration may need to be refreshed so that the active portion of the screen matches the underlying graphics.

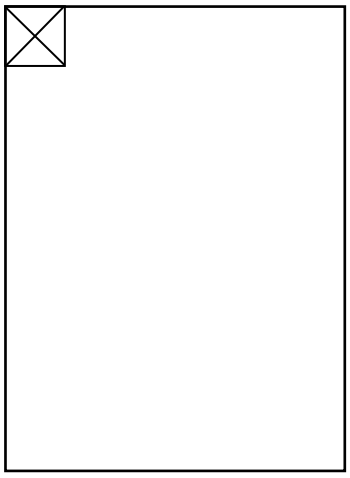
Recalibrate the Touchscreen as follows:

1. Press the **Settings** tab.
2. Press the **Disp/Reye** key.
3. Page forward to the second page and press the line:
   810 Cali Display
4. The settings display will show the Cali Display screen.
5. Press the **Enable** key.
6. Press the **Write** key. (This will write the subsequent calibration values to the Control board.)
7. The display will switch to the CALIBRATION SCREEN shown below.
8. Gently press a stylus, or similar fine pointed tool, to the center of the X located at the top left-hand side of the display.
9. As soon as the information is read, a second X will be displayed at the top right-hand of the display. Repeat Step 7.
10. Repeat Step 7 for X displayed at the lower right-hand side of the display.
11. Repeat Step 7 for the X displayed at the lower left-hand side of the display.
12. After completing Step 10, the display will return to the *Cali Display* screen. Press the **Quit** key.

The touchscreen has been successfully recalibrated and the resulting values stored on the Control PCB.



Cali Display SCREEN


CALIBRATION SCREEN

18. Communication Interfaces

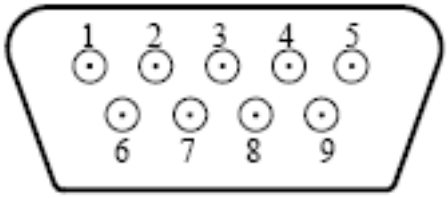
18.1 Remote Contacts

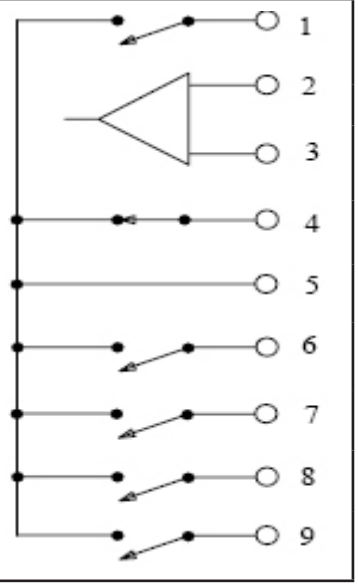
The remote contacts interface is provided as a set of solid state switching devices. The switches are available through a DB9 male connector on the rear of the UPS. The following chart shows the pin assignment for each signal.

MAXIMUM CURRENT CARRYING CAPACITY OF THE SWITCH

Voltage	Current
48 Vdc peak	70 mA peak
30 Vac rms (42 Vac peak)	50 mA rms (70 mA peak)

DB9 MALE CONNECTOR OUTLINE (FACING CONNECTOR)



Pin	Signal Function	Logic	In the UPS
1	Fault Signal	Closed when fault detected	
2	UPS stop common	Backup stop when the level changes from Low (-3 to -15 V) to High (+3 to +15 V)	
3	UPS stop signal input		
4	Normal input power supply	Closed with normal supply power	
5	Signal common	Common signal return	
6	Bypass operation	Closed during bypass operation	
7	Battery voltage drop	Closed at voltage drop	
8	UPS operation	Closed during inverter operation	
9	Power failure signal	Closed at power failure	

NOTE: Pin switches are shown in their inactive states. For example, if battery voltage is low, pin 7 will be connected to pin 5.

18.2 UPS LAN Shutdown Signal Operation

When the UPS stop signal is sent to the UPS through pin 2 and 3 of the external contact interface, it is possible to automatically reset the following operating systems (OS), which can automatically implement the shutdown function and restart the operation: **Windows NT, IBM OS/2 LAN server, LANtastic**

Parameter 646 – UPS Shutdown by LAN Input Signal Enabled/Disabled

Parameter 647 – UPS Shutdown by LAN Signal Permitted Time Window (Adjustable)

With the **UPS Shutdown by LAN Signal** function enabled, when line power fails and the UPS goes to backup the LAN will shutdown even if the UPS returns to normal mode during the shutdown process.

LAN shutdown can take several minutes. The **UPS Shutdown by LAN Signal** function has a companion **UPS Shutdown by LAN Signal Permitted Time Window** parameter that can be set to allow sufficient time to complete the LAN shutdown process (default: 10 minutes) even if line power is restored during LAN shutdown.

LAN shutdown is treated as a restart after battery shutdown. The restart of the LAN will be determined by the **Restart After Battery Shutdown** timer.

Connect only the UPS stop signal to the external contact interface for automatic processing so that the UPS output will not be turned off by mistake.

If the computer is started/restarted within 10 minutes after the recovery from a power failure, the power supply may be reset while the computer is restarting.

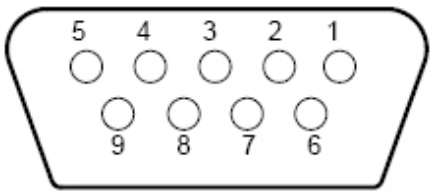
18.3 RS-232C

The RS232C port can be used by authorized service personnel. The port is provided using a DB9 female connector located on the rear of the UPS. For reference, the pinout of the connector is illustrated below.

RS-232C CONNECTOR PIN ASSIGNMENT

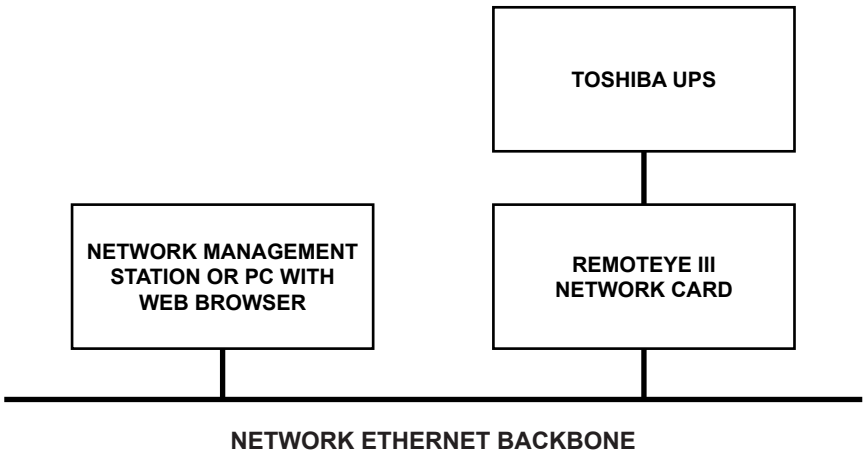
Pin	I/O	Symbol	Description
1	This pin is not used		
2	Input	RXD	Receive data
3	Output	TXD	Transmit data
4	Output	DTR	Data terminal ready
5	-	SG	Signal ground
6	Input	DSR	Data set ready
7	Output	RTS	Request to send
8	Input	CTS	Clear to send
9	This pin is not used		

DB9 FEMALE CONNECTOR OUTLINE (FACING CONNECTOR)



18.4 RemotEye III Network Card

The RemotEye III is an optional network card for the Toshiba UPS. This card slides into a slot located on the back side (page 60-61) of the UPS. The card provides a network, or LAN-based communication interface for the UPS. When installed, the UPS can be managed remotely using the common SNMP and HTTP web-based network protocols. The following diagram shows the flow of the Network Management Station.



18.5 EMD

The **Environmental Monitoring Device (EMD)** is a monitoring device that provides real time comprehensive remote monitoring of environment temperature, environment humidity and other conditions via the RemotEye III Network Card. The EMD also provides two user-defined dry contacts for additional monitoring. These dry contacts can be used with devices that provide normally-open or normally-closed results, such as door sensors, smoke detectors, motion detectors, and liquid detectors.

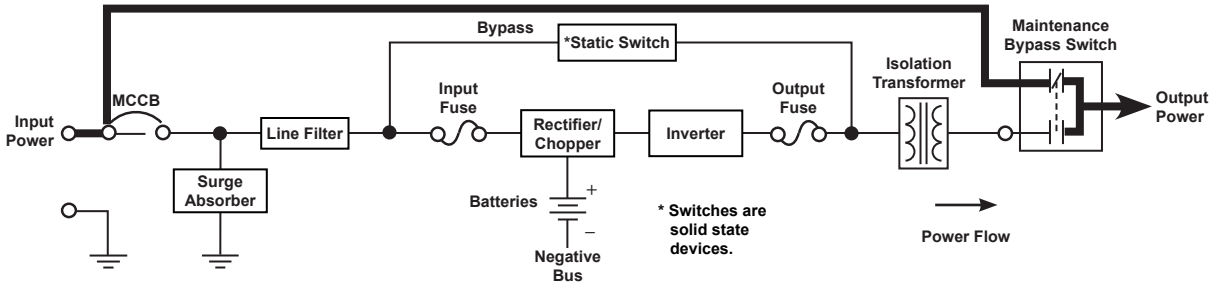
19. Optional MB (Maintenance Bypass) Units

The following illustration shows the circuit power flow when the UPS is operating in the optional Maintenance Bypass mode. The input jumper on the UPS must be set for 240 VAC.

NOTICE

Ensure the UPS is in Static Bypass before switching the unit from UPS to Maintenance Bypass mode or from Maintenance Bypass to UPS mode. Failure to do so could result in damage to the maintenance bypass switch or the UPS.

This Maintenance Bypass unit can only be used for 240 V applications. Ensure the UPS voltage selector jumper is set to 240 V. See page 12 for the correct 240 V setting.



POWER FLOW IN MAINTENANCE BYPASS MODE FOR ALL MODELS

19.1 Internal Maintenance Bypass

The optional internal maintenance bypass is mounted on the rear of the UPS.

Internal Maintenance Bypass Instructions:

From Inverter Mode to Maintenance Bypass Mode

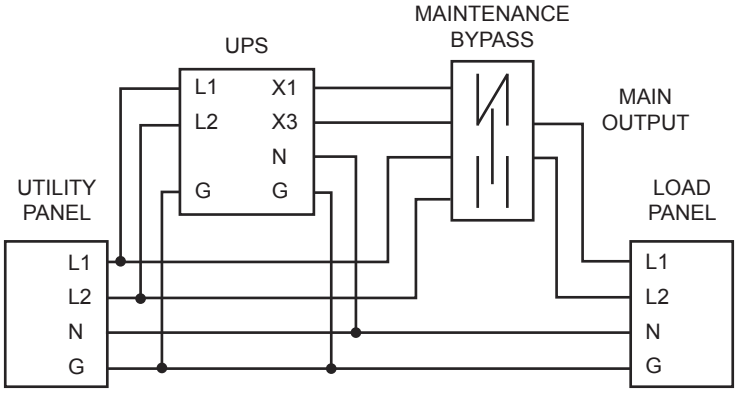
1. Turn the RUN/STOP switch to the STOP position on the UPS.
2. Turn the Maintenance Bypass Switch to the Bypass position. The Bypass LED should be ON and the UPS LED should be OFF. The LEDs are next to the Maintenance Bypass switch, on the back of the UPS.
3. Turn the MCCB input breaker on the UPS to the OFF position. The UPS is now operating in Maintenance Bypass Mode.

From Maintenance Bypass Mode to Inverter Mode

1. Turn the MCCB input breaker on the UPS to the ON position.
2. Turn the Maintenance Bypass switch to the UPS position. The UPS LED should be ON and the Bypass LED OFF.
3. Turn the RUN/STOP switch to the RUN position on the UPS. The UPS is now operating in the UPS Mode.

19.2 External Maintenance Bypass

Wiring
The following connections must be made to the Utility Panel and the Load Panel. The Main UPS output is located on the terminal block on the back of the UPS. (TB-4(X1) and TB-7(X3) 240 VAC.)



See the application instructions included with the External Maintenance Bypass Unit for wiring details.

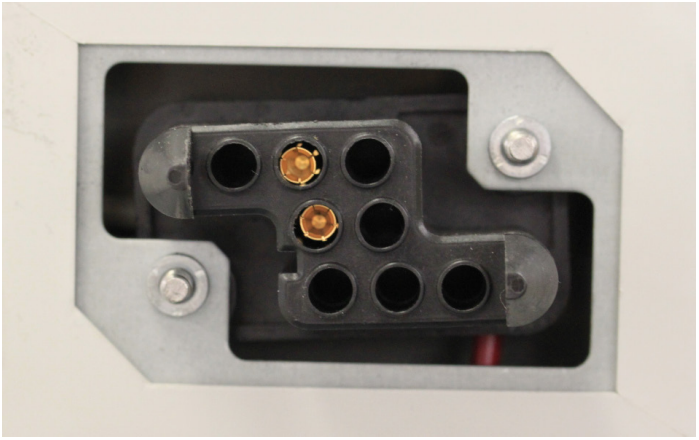
20. Battery Pack Replacement

The 1600XP come equipped with a set of internal backup batteries packaged in sets of 6 batteries per battery pack. The two battery packs, P/N 51896, and P/N 60995 are outwardly similar but distinctly different.

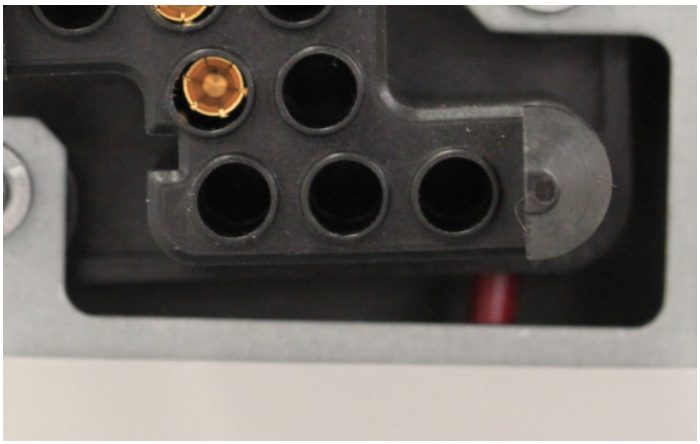
NOTICE

Ensure the 1600XP battery packs are replaced with battery packs of the same part number. Failure to do so may cause unexpected loss of backup power.

Battery Tray Plug for:
3.6, 6, 8, 14, and 18 kVA
P/N 51896-FS



Battery Tray Plug for:
10 and 22 kVA
P/N 60995-FS
(Dual conductors because of higher per/battery pack discharge current)



1600XP BATTERY TRAY PLUG DIFFERENCES

21. Optional Receptacle Panel Installation Instructions

These are the instructions for installing the optional Modular Output Receptacle Panels for the 1600XP Series UPS. These instructions apply to all UH3-RP-XX panel options.

WARNING: The work outlined in these instructions is to be performed only on a completely un-energized UPS system.

Refer to Figure 1 for location of UPS referenced material. Refer to Figure 2 for material referring to the receptacle panel module. There are different panels available depending on the UPS typeform.

Step 1: Remove the modular receptacle panel cover plate.
On the rear of the UPS, locate the cover plate for the receptacle panel module interface (see Figure 1).
Remove the 6 mounting screws.
Remove the cover plate. A square-shaped plug will be exposed.

Step 2: Snap-In Output Receptacle modular panel.
Carefully mate the square-shaped connector on the UPS to its matching counter part on the rear of the modular panel.

Step 3: Mount the receptacle panel.
Attach the screws removed from the cover plate through the mounting holes of the receptacle panels and back into the UPS mounting points.

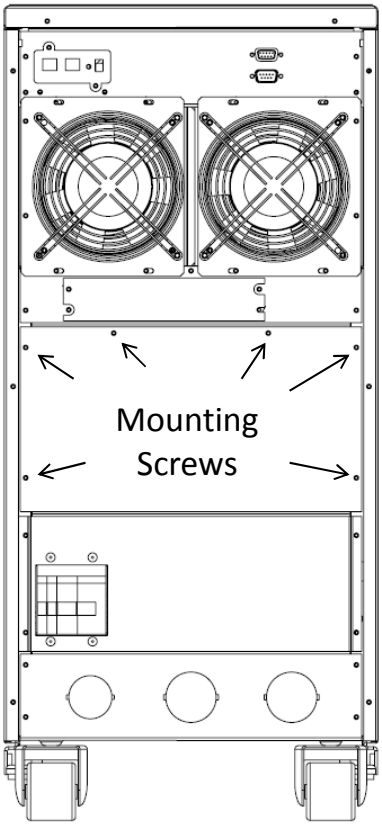


Figure 1

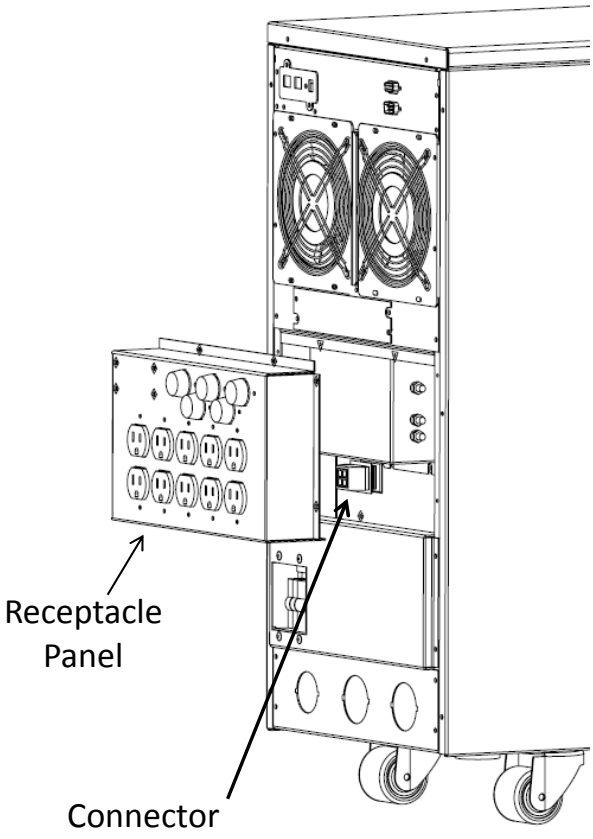
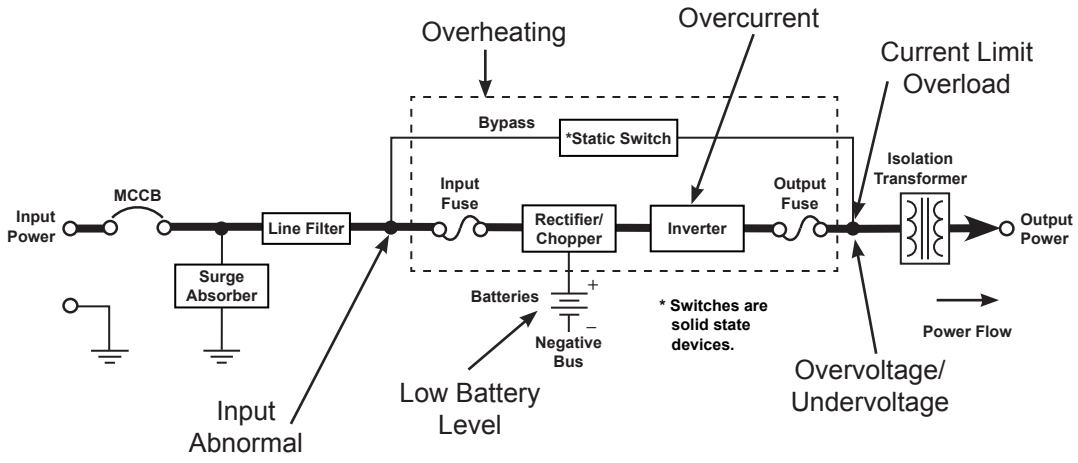


Figure 2

22. UPS Protection System

22.1 System Protection Features

The following schematic shows the electrical locations of the protection devices on the UPS.



22.2 System Protection Functions

The following charts show the built-in system fault protection functions on all the UPS models.

BUILT-IN UPS FAULT PROTECTION FUNCTIONS

Protection Item	Output Overvoltage	Output Undervoltage	Output Overload
LCD Message	**OUT-OV**	**OUT-UV**	**OVERLOAD**
Cause	Control malfunction; EEPROM error	Control malfunction; Fuse opened; Load issue	Overload – Short circuit at load
Operation Mode After Fault	Bypass operation – Chopper and inverter are stopped		Inverter OL: Transfer to bypass; Bypass OL: Inverter, chopper stopped
Audible Alarm	Yes – Continuous buzzer		See Audible Alarm Functions on page 33
Visible Alarm	Red Fault LED on		Inverter OL: Fault lamp off Bypass OL: Fault lamp on
Relay Contact Alarm	Fault relay closed Bypass relay closed		Fault relay open; Inverter OL: Bypass relay closed Bypass OL: Bypass relay open
Auto-retransfer	No		Inverter OL: Yes if bypass is OK Bypass OL: No

BUILT-IN UPS FAULT PROTECTION FUNCTIONS (CONT'D)

Protection Item	Internal Overheat	DC Circuit Overvoltage	DC Circuit Overcurrent
LCD Message	OVERHEAT	DC-OV	DC-OC
Cause	Fan failure; High ambient temperature	Chopper malfunction	Inverter/chopper fault
Operation Mode After Fault	Shutdown – No output	Bypass operation – Chopper and inverter are stopped Inverter OL – Transfer to bypass	
Audible Alarm	Yes – Continuous buzzer		
Visible Alarm	Red Fault LED on		
Relay Contact Alarm	Fault relay closed Bypass relay closed		
Auto-retransfer	No		

23. Preventive Maintenance/Parts Replacement

23.1 Preventive Maintenance

Toshiba 1600XP Series of uninterruptible power systems have been designed to provide years of trouble-free operation requiring a minimum of preventive maintenance.

The best preventive measure that the UPS user can take is to keep the area around the unit, particularly the air inlet vents, clean and free of moisture and dust accumulations. If the atmosphere of the installation site is very dusty, use a vacuum cleaner to periodically remove dust accumulations around and from the unit.

⚠ CAUTION

Only a qualified Toshiba representative should be allowed to perform any routine maintenance or service on this equipment other than those preventive maintenance details which are described directly above this caution.

23.2 Cleaning the Touchscreen

The touchscreen display is covered with a protective Teflon coating. It should be cleaned with a clean, damp cotton cloth to avoid scratching the coating.

23.3 System Fault Messages

A Fault message is generated when either a fault condition occurs, or a warning condition occurs three times within ten minutes. The table below shows the possible fault messages and what actions need be taken.

If the input voltage is normal when the fault occurs then the UPS will switch immediately to the bypass mode to continuously feed power to the load.

If the fault condition occurs while the input power is abnormal and the UPS is in Bypass mode the UPS will shut down the output to prevent load equipment damage.

When a Fault condition exists, the red LED on the UPS display panel will illuminate until the fault is cleared.

All faults are recorded. The fault status can cleared by cycling power (turn off, then turn on) after the problem has been fixed.

Display	Recrd-ed	Meaning	Action
BYPOH	Y	Bypass Overheat – Overheating condition occurred.	Check unit for blocked or in-operable fan. Lower ambient temperature if it is greater than 104 °F (40 °C). Bypass operation will also cease if overheat condition is not corrected within 1 hr. of inverter shutdown. Try restarting. If condition re-occurs plan for total shutdown and call for service.
BYPOL	Y	Bypass Overload – UPS is overloaded.	Shut down excess equipment to reduce load.
CHRGOV	Y	Charger Overvoltage – Charger overvoltage condition occurred.	UPS is faulty. Check the UPS operation conditions at time of fault. Not advisable to restart the UPS. Call Toshiba for service.
CLMT	Y	Current Limit – Load on UPS output exceeds unit specifications.	Reduce load on UPS output.
DCIB	Y	DC Bus Imbalance – DC voltage imbalance occurred.	Possible causes are UPS fault are connection of half-wave rectifier load. Check load and try restarting. If condition persists,call Toshiba for service.
DCOC	Y	DC Bus Overcurrent – DC overcurrent condition occurred.	UPS is faulty. Check the UPS operation conditions at time of fault. Not advisable to restart the UPS. Call Toshiba for service.
DCOV	Y	DC Bus Overvoltage – DC overvoltage condition occurred.	UPS is faulty, input wiring error, input overvoltage or connection of a motor load. Try restarting. If condition persists call Toshiba for service.
DCUVBS	Y	DC Bus Undervoltage during Boostup Mode – DC Bus undervoltage condition occurred.	UPS is faulty. Check the UPS operation conditions at time of fault. Not advisable to restart the UPS. Call Toshiba for service.
DCUVC	Y	DC Bus Undervoltage During Charging Mode – DC Bus undervoltage condition occurred.	UPS is faulty. Check the UPS operation conditions at time of fault. Not advisable to restart the UPS. Call Toshiba for service.
DVCOH	Y	Device Overheat – Overheating condition occurred.	Reduce equipment load to 100% or less and try restarting.
FSOPEN	Y	Fuse Open.	Replace fuse.

INVOLNR	Y	Inverter Overload (Not Resettable) – Output overload condition occurred.	Reduce equipment load to 100% or less and manually restart the UPS.
INVOLR	Y	Inverter Overload (Resettable) – Output overload condition occurred.	Reduce equipment load to 100% or less, the UPS will retransfer.
OOC	Y	Output Overcurrent – UPS is overloaded.	Shut down excess equipment to reduce load.
VOOV	Y	Output Overvoltage – Output overvoltage condition occurred.	UPS is possibly faulty. Check the UPS operation conditions at time of fault. Not advisable to restart the UPS. Call Toshiba for service.
VOUV	Y	Output Undervoltage – Output undervoltage condition occurred.	UPS is possibly faulty. Check the UPS operation conditions at time of fault. Not advisable to restart the UPS. Call Toshiba for service.

23.4 System Warning Messages

Warning messages are generated when a noncritical abnormal operating condition occurs. The following tables shows possible messages and their meaning.

When a Warning condition exists, the amber LED on the UPS display panel will flash for the duration of the Warning condition.

All warnings will clear after the appropriate action has been taken.

Display	Recorded	Meaning	Action
AOH	Y	Ambient Overheat – The unit is overheated (warning is given when the internal temperature reaches and exceeds 50° C ambient).	Check to see if the ambient temperature is greater than 104 °F (40 °C) If so, turn on air conditioning and check the ventilation fan at the back of the unit for operation or obstructions. Otherwise, shut down the unit and call Toshiba for service.
ASYN	N	Asynchronous mode – Input and output frequency are different. Bypass is disabled.	No Action Needed.
BDEPL	N	Battery Depleted – Battery not within specifications.	Call Toshiba for service.
BLFE	Y	Battery Lifetime End – Batteries at end of life.	Have batteries replaced immediately.
BLFN	Y	Battery Lifetime Near End – Batteries are nearing the end of their expected lifetime.	Call Toshiba for service.
BOH	Y	Battery Overheat – Battery not within specifications.	Call Toshiba for service.
BRPL	Y	Replace Battery – Battery at end of life expectancy.	Replace battery immediately.

BSDV	N	Battery Shutdown Voltage – Battery is discharged down to minimum level.	UPS will shut down.
BTSTFL	N	Battery Test Failed – Battery not within specifications.	Call Toshiba for service.
BYPOV	N	Bypass Overvoltage – Bypass voltage exceeds UPS specifications.	Depends on UPS mode.
BYPUV	N	Bypass Undervoltage – Bypass voltage less than UPS specifications.	Depends on UPS mode.
CALL	Y	Service Call Required – Inspection of the unit is advised.	Have inspection/service performed.
CHRGOV	Y	Charger Overvoltage – Battery Charger not within specifications.	Call Toshiba for service.
CLMT	N	Current Limit – UPS not within specifications.	Call Toshiba for service.
DCER	Y	Display Cable Error – Display cable is disconnected.	Connect the display cable.
DCANERR	N	Communication Error between Display and Main Controllers.	Call Toshiba for service.
FBYPER	N	Bypass Frequency Error – Input frequency outside of UPS specifications.	Depends on UPS mode.
FIER	N	Input Frequency Error – Input frequency outside of 45-65 Hz range.	Depends on UPS mode.
LB	N	Low Battery – The battery level has dropped low (about 90% or less) during operation. Continued operation in this mode will deplete battery and cause output shut down.	Immediately shut down the load equipment in an orderly fashion and then press the STOP key.
OL110	N	Overload – UPS is overloaded (110% and above) Unit will switch to bypass operation or shut down if no action is taken.	Shut down excess equipment to reduce load.
REYEERR	N	Communication Error between RemotEye and UPS.	Ensure RemotEye is connected to UPS. Call Toshiba for service.
RS232ERR	N	Communication Error at Service Port.	Call Toshiba for service.
REYEUER	N	Communication Error at LAN.	Call Toshiba for service.
VDCUVBT	N	DC Bus Undervoltage During Battery Test.	Call Toshiba for service.
VIOV	N	Input Overvoltage – Input voltage exceeds UPS specifications.	Depends on UPS mode.
VIUV	N	Input Undervoltage – Input voltage less than UPS specifications.	Depends on UPS mode.

23.5 System Mode Messages

A UPS Mode message is generated when the UPS changes operating mode. The following tables list the possible operating modes for the UPS.

Display	Meaning
Backup	Backup – Power comes from other than input.
BattTest	Battery Test – Battery test in progress.
Bypass	Bypass – UPS is offline, power is being provided directly from UPS input.
On-Line	On-Line – Input converter and inverter are running (Double conversion mode).
Shutdown	Shutdown – No output, DC Bus is charged through Softstart Resistor.
Startup	Startup – UPS is starting up.

23.6 System Status Messages

A UPS Status message is generated when the UPS changes its status (from inverter to bypass mode, for example). The table below shows the possible Status messages and their meaning.

Display	Meaning	Action
BYP	Bypass mode – Power is supplied by UPS input.	No action needed.
CHRGERR	Charger Error – Charger overvoltage error.	Call Toshiba for service.
DLYST	Delay Start – UPS is counting down prior to startup.	No action needed.
EE1ST	EEPROM is loaded with default values.	No action needed.
EE2RAERR	EEPROM to RAM loading Error.	Call Toshiba for service.
EEUPERR	EEPROM updating Error.	Call Toshiba for service.
EPO	EPO circuit is active.	Reset EPO switch to start.
FIERRST	Frequency Input Error Start – Input frequency could not be detected and UPS starts up with default EEPROM setup.	Ensure correct input frequency is selected in UPS settings.
FLT	A fault has occurred.	See Fault records.
FWUPERR	Firmware Update Error.	Call Toshiba for service.
INIT	Initialization – UPS is inatilizing.	No action needed.
INV	Inverter mode.	Inverter is running (it can be On-Line, Battery Test, or Backup)

LANSD	UPS goes to Shutdown triggered from customer supplied LAN SD circuit.	Deactivate LAN shutdown signal to reset.
LB	Low Battery – The battery level has dropped low (about 90% or less) during operation. Continued operation in this mode will deplete battery and cause output shut down.	Immediately shut down the load equipment in an orderly fashion and then press the STOP key.
PFAIL	Input power failure.	No action needed.
RMTSD	Remote shutdown occurred.	Disconnect LAN signal to reset.
RO2EEERR	ROM to EE Loading Error.	Call Toshiba for service.
SYNC	Synchronous mode.	Input and output are synchronized.
TIMEDSD	UPS is counting down prior to shutdown.	Immediately shut down the load equipment in an orderly fashion and then press the STOP key.
WRN	A warning has occurred.	See Warning record.

23.7 Parts Replacement

The following list shows recommended intervals for periodic replacement of certain UPS parts:

1. Aluminum electrolytic capacitors: Replace once every 5 years.
2. Fuses: Replace once every 7 years.
3. Cooling fan: When operated in an ambient temperature of 86 °F (30 °C) to 104 °F (40° C), replace every 3.5 years. When operated in an ambient temperature of less than 86 °F (30 °C) , replace every 5 years.

   NOTE: The cooling fans are not hot swappable. Remove all power from the UPS before replacing the cooling fans.

   (Open the UPS main circuit breaker, disconnect external battery cabinets, and partially slide out the top battery trays enough to open the internal DC power circuit.)`
4. Batteries: In order to maintain system reliability, the UPS batteries should be replaced on a regular schedule. To ensure reliable operation, all of the batteries should be replaced at the same time. Use the following chart for replacement:

UPS BATTERY REPLACEMENT

BATT AMB TEMP*	AVERAGE LIFETIME
68 – 77 °F (20 – 25 °C)	Approximately 5 yrs.
86 °F (30 °C)	Approximately 3.5 yrs.
95 °F (35 °C)	Approximately 2.5 yrs.
104 °F (40 °C)	Approximately 1.8 yrs.
113 °F (45 °C)	Approximately 1.25 yrs.

* Continual operation at ambient temperatures above 25 °C will degrade the battery life.

24. External Layouts/Dimensions/Shipping Weights

24.1 Electrical Conduit Knock-out Data

ELECTRICAL CONDUIT KNOCK-OUT HOLE SIZES (DIAMETER)						
3.6 kVA	**6 kVA**	**8 kVA**	**10 kVA**	**14 kVA**	**18 kVA**	**22 kVA**
3 ea. Back/ Bottom 1.125 in. (28.575 mm)	3 ea. Back/ Bottom 1.125 in. (43.69 mm)	2 ea. Back/ 3 ea. Bottom 1.75 in. (44.5 mm)	2 ea. Back/ 3 ea. Bottom 1.75 in. (44.5 mm)	4 ea. Back/ Bottom 1.75 in. (44.5 mm)	4 ea. Back/ Bottom 1.75 in. (44.5 mm)	4 ea. Back/ Bottom 1.75 in. (44.5 mm)
–	–	1 ea. Back 1.5 in. (38.1 mm)	1 ea. Back 1.5 in. (38.1 mm)	–	–	–

24.2 Unit and Shipping Weights

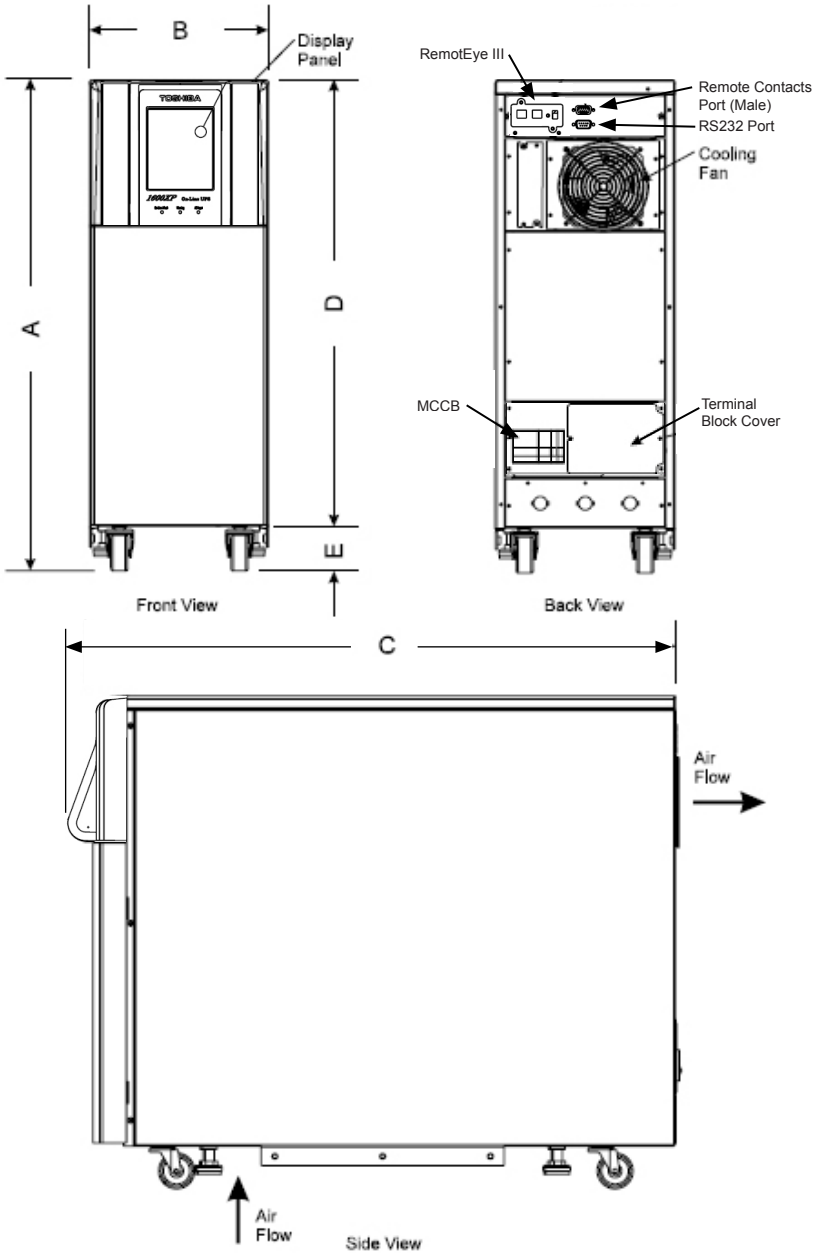
Model	Unit Weight		Shipping Weight	
	Pounds	**Kilograms**	**Pounds**	**Kilograms**
3.6 kVA	250	113	325	147
6 kVA	288	130	395	179
8 kVA	466	211	533	242
10 kVA	491	223	532	241
14 kVA	938[1]	425.5[1]	995[1]	451[1]
18 kVA	938[1]	425.5[1]	995[1]	451[1]
22 kVA	938[1]	425.5[1]	995[1]	451[1]

1. Subject to change without notice.

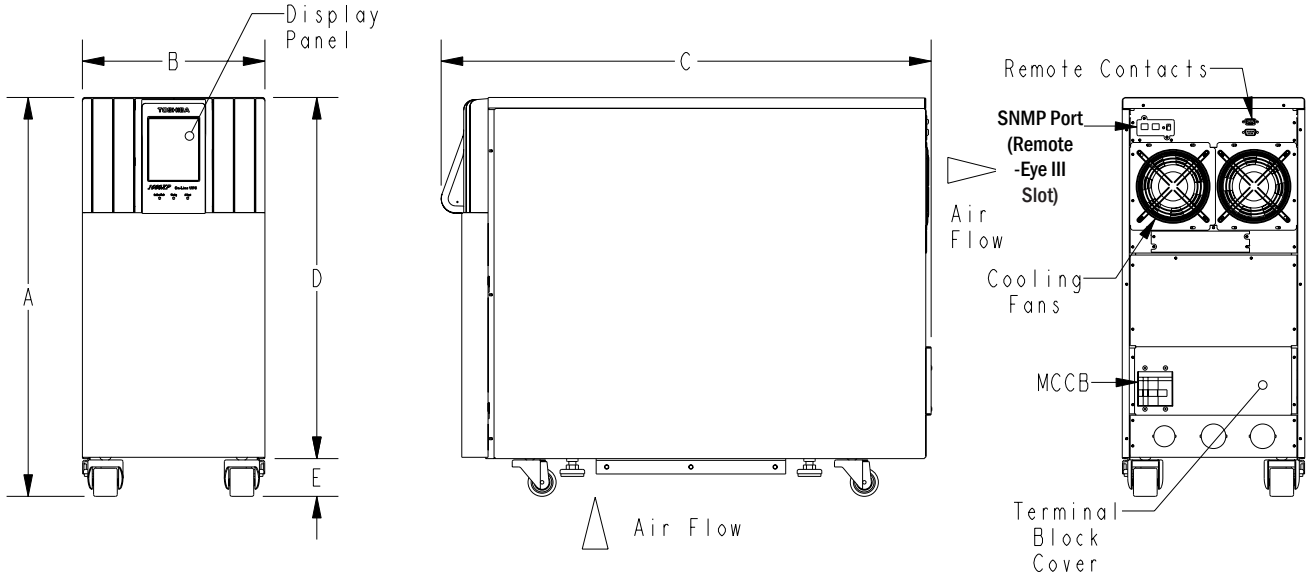
24.3 Dimensional Data

	DIMENSIONAL DATA						
	3.6 kVA	**6 kVA**	**8 kVA**	**10 kVA**	**14 kVA**	**18 kVA**	**22 kVA**
A	22.1 in. (561 mm)	27.5 in. (698 mm)	28.3 in. (719 mm)	28.3 in. (719 mm)	39.0 in. (991 mm)	39.0 in. (991 mm)	39.0 in. (991 mm)
B	10.0 in. (254 mm)	10.0 in. (254 mm)	13.0 in. (330 mm)	13.0 in. (330 mm)	17.5 in. (445 mm)	17.5 in. (445 mm)	17.5 in. (445 mm)
C	34.0 in. (863 mm)	34.0 in. (864 mm)	34.9 in. (886 mm)	34.9 in. (886 mm)	36.1 in. (917 mm)	36.1 in. (917 mm)	36.1 in. (917 mm)
D	19.7 in. (500 mm)	25.1 in. (637 mm)	25.7 in. (654 mm)	25.7 in. (654 mm)	35.6 in. (904 mm)	35.6 in. (904 mm)	35.6 in. (904 mm)
E	2.4 in. (61 mm)	2.4 in. (61 mm)	2.6 in. (65 mm)	2.6 in. (65 mm)	3.4 in. (87 mm)	3.4 in. (87 mm)	3.4 in. (87 mm)

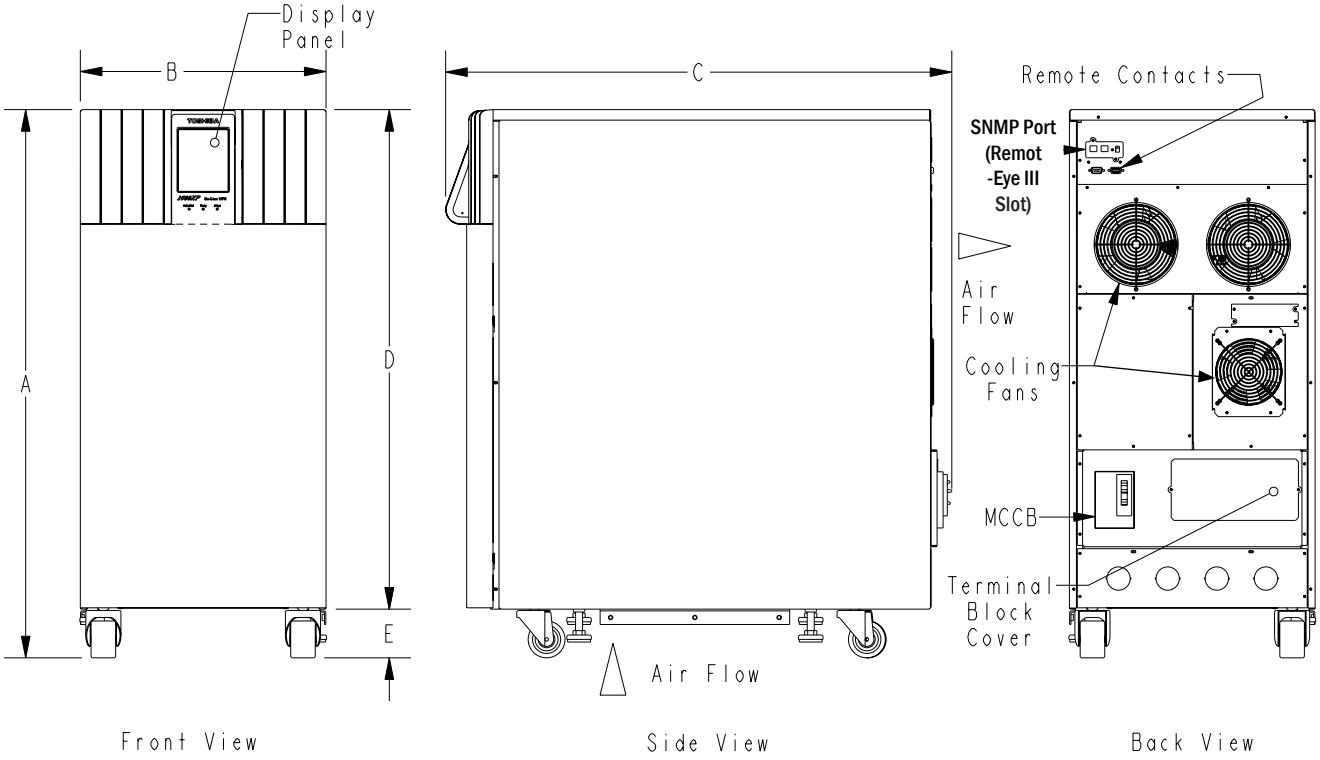
24.4 Dimensional Data (Cont.)



External Layout for 3.6kVA and 6kVA units



External Layout for 8kVA and 10kVA units



External Layout for 14kVA, 18kVA and 22kVA units

Appendix A: 1600XP Specifications

Standard Model: 3.6 – 10 kva

Unit (Capacity)	3.6kVA (3.1 kW) [1]	6 kVA (5.1 kW) [1]	8 kVA (6.8 kW) [1]	10 kVA (8.5 kW) [1]
General				
Topology	True On-Line			
Certifications	ANSI C62.41 (IEEE 587), UL 1778, CUL, CE, FCC Class A , NEC (NFPS-70), NEMA/ PE1-1993, OSHA, ASME, ISO 9001, ISO 14001:2004 , RoHS Compliant			
Input Characteristics				
Input Voltage[1]	Single-phase, 208/240 Vac, +10% to -30%[1]			
Input Frequency	45 – 65 Hz (auto-sensing)			
Input Capacity	3.6 kVA	6 kVA	8.0 kVA	10 kVA
Input /(Max Input) Current @208V	17.9 (18.7) A	29.8 (31.1) A	38.9 (40.5) A	48.6 (50.2) A
Input/(Max. Input) Current @240V	15.5 (16.2) A	25.9 (27.0) A	33.7 (35.1) A	42.1 (43.5) A
Input Power Factor	0.98 Typical, 0.95 Minimum@ 100% Load			
Current THD (linear load)	< 5% total harmonic distortion			
Internal AC Input Breaker Rating	30 A/277 V	50 A/277 V	60 A/277 V	63 A/277 V
Battery Characteristics				
Battery Type	Valve Regulated Lead Acid, Flame Retardant			
Backup time, fully charged @ 0.7 power factor, 77 °F	8 min.[2]	8 min.[2]	7 min.[2]	7 min.[2]
Backup time, fully charged @ 0.85 power factor, 77 °F	7 min.[2]	7 min.[2]	7 min.[2]	5 min.[2]
Recharge Time	24 hr. (full), 12 hr. (90%) for internal batteries only[3]			
Battery Voltage (Nominal)	144 Vdc	216 Vdc	288 Vdc	
Output Characteristics				
Output Voltage	Single-phase, 240/208/120 V			
Output Voltage Regulation	= ± 3%			
Output Frequency	±0.5 Hz/1.0 Hz/1.5 Hz (factory or authorized service center selectable only)			
AUTO/MAN Frequency	Factory or authorized service center selectable only			
Voltage THD	< 3% for linear load; < 6% for non-linear load			
Common-Mode Noise	< 0.5 Vrms			
Rated Load Power Factor[1]	0.85 (0.6 – 1.0) lagging			
Efficiency (ac-dc-ac)	≥83%		>85%	
Voltage Transient	< ±8% (Load of 0 – 100 %)			
Voltage Transient Recovery	50 ms to within 2% of nominal			
Rated Output Current (rms)	15 A	25 A	33.3 A	41.6 A
Max Peak Output Current	45 A	75 A	100 A	125 A
Inverter Overload Capacity	125% for 30 sec./150% for 10 sec.			
Bypass Overload Capacity	125% for 10 min./1000% for 1 cycle			
Crest Factor	3.0			

1. **Input/output figures rated for 240 volts unless otherwise stated. Output ratings given for 0.85PF are only valid when the input voltage is greater than 204 volts; otherwise, ratings given for 0.70PF are applicable.**
2. Battery backup time may vary depending on the operating conditions and ambient temperature at the installation site.
3. An initial charge time of 24 hrs. is necessary to obtain proper battery performance level before unit is placed in operation.

STANDARD MODELS: 3.6 – 10 KVA (CONT'D)

Unit (Capacity)	3.6kVA (3.1 kW) [1]	6 kVA (5.1 kW) [1]	8 kVA (6.8 kW) [1]	10 kVA (8.5 kW) [1]
Environment				
Operating Temperature 59 – 77 °F (15 – 25 °C) Recommended	60 Hz 32 – 104 °F (0 – 40 °C) 50 Hz 32 – 91 °F (0 – 33 °C)			
Storage Temperature	-4 – 104 °F (-20 – 40 °C)			
Installation Area	To be installed in a well ventilated area free of airborne dust, metal particles or flammable gas, allow at least 4 inches on all sides			
Operating Humidity	30 – 90% non-condensing			
Altitude	< 6600 ft. (2000 m) above sea level [2]			
Acoustical Noise	50 dB (A) maximum @ 1 meter from front panel			
Heat Generation (Typical)	2139 BTU/Hr	3564 BTU/Hr	4095 BTU/Hr	5118 BTU/Hr
Operation Diagnosis				
Battery Check	Performed on start up, by schedule, on-demand (user configurable)			
Input OV Protection	Standard			
Battery Lifetime	UPS calculates battery replacement time based upon battery ambient temperature (LCD display, LED and beeps)			
Internal Temperature	UPS gives indication of internal temperature, alarm when high temp			
Event Data Storage	32 – Operation, 32 – Backup, 32 - Warnings, 32 – Faults, 32 - Test, 32 - System			
Applications				
Switches	Generator compatible			
Bypass Switch				
Bypass Disable	Static switch < ¼ cycle (50 Hz – 5 ms/60 Hz – 4.16 ms)			
Automatic Retransfer	Factory or authorized service center selectable only			
Interface/Communications				
Real Time Clock	Real Time Clock with backup Lithium Ion Battery			
Schedule Operation	Schedule ON/OFF operation of UPS using optional RemotEye III communication software			
Autostart	Automatic UPS Startup when AC is applied - Option can be enabled or disabled at user's discretion			
Remote ON/OFF	Standard – External terminal			
Emergency Power Off	Standard – Terminal contacts only			
LED Display	3 LED's indicating On-Line/Fault, Warning, and A/C Input			
Operator Interface	Interactive Touchscreen			
Buzzer Volume	Standard (Fixed Volume)			
Power Connections	Standard – Hard wire, Optional – Receptacle Panel w/ Power Cord			
Remote Contacts	Standard (INV, BYP, BATT, LB, AC, FLT)			
RS232 ASCII Interface	Toshiba UPS Communication Protocol 2.0			

1. **Input/output figures rated for 240 volts unless otherwise stated. Output ratings given for 0.85PF are only valid when the input voltage is greater than 204 volts; otherwise, ratings given for 0.70PF are applicable.**
2. At 6600 ft (2000 m) above sea level, output capacity should be derated by 3%

STANDARD MODELS: 3.6 – 10 KVA (CONT'D)

Unit (Capacity)	3.6kVA (3.1 kW) [1]	6 kVA (5.1 kW) [1]	8 kVA (6.8 kW) [1]	10 kVA (8.5 kW) [1]
Mechanical Design				
Topology	Unit enclosure is made from sheet metal meeting NEMA1 and UL Type 1			
Size (HxWxD) (max)	22.1x 10 x 34 in. (561 x 254 x 864 mm)	27.5 x 10 x 34 in. (699 x 254 x 864 mm)	28.4x 13 x 34.9 in. (721 x 330 x 886 mm)	28.4x 13 x 34.9 in. (721 x 330 x 886 mm)
Paint System	Powder coating			
Fan Panel[2]	Panel mounted on back of UPS to allow for easy replacement of fans			
Battery System				
Battery Replacement	Slide out battery packs accessible from front of UPS. Factory or authorized service center serviceable only.			
Battery Packs	Designed for battery acid leakage containment with six (6) batteries per pack			
Battery Pack Size (HxWxD) max.	5.0 x 7.3 x 19.0 in. (127 x 185 x 483 mm)			
Battery Pack Quantity	2	3	4	
Battery Manufacturer	YUASA			
Battery Type	REW45-12FR			
Toshiba's Part Number for Battery Pack	51896-FS			60995-FS

1. **Input/output figures rated for 240 volts unless otherwise stated. Output ratings given for 0.85PF are only valid when the input voltage is greater than 204 volts; otherwise, ratings given for 0.70PF are applicable.**
2. **Remove all sources of main AC power and wait five minutes before replacing fans.**

Standard Models: 14 – 22 kva

Capacity	14 kVA (11.9 kW)[1]	18 kVA (15.3 kW)[1]	22 kVA (18.7 kW)[1, 5]
General			
Topology	True On-Line		
Certifications	ANSI C62.41 (IEEE 587), UL 1778, CUL, CE, FCC Class A , NEC (NFPS-70), NEMA/PE1-1993, OSHA, ASME, ISO 9001, ISO 14001:2004 , RoHS Compliant		
Input Characteristics			
Input Voltage [1]	Single-phase, 208/240 VAC, +10% to –30%[1]		
Input Frequency	45-65 Hz (auto-sensing)		
Input Capacity	14 kVA	18 kVA	22 kVA
Input /(Max Input) Current @208V	67.2 (68.9) A	86.4 (88.1) A	106 (107) A
Input /(Max Input) Current @240V	58.2 (59.7) A	74.9 (76.3) A	92.0 (93.0) A
Input Power Factor	0.98 Typical, 0.95 Minimum@ 100% Load[1]		
Current THD (linear load)	< 5%		
Internal AC Input Breaker rating	100 A / 277 V		125 A / 277 V
Battery Characteristics			
Battery Type	Valve Regulated Lead Acid, Flame Retardant		
Backup time, fully charged @ 0.7 power factor, 77 F	7 min.[2]		5 min.[2]
Backup time, fully charged @ 0.85 power factor, 77 F	7 min.[2]	5 min.[2]	3 min.[2]
Recharge Time	24hr. (full), 12hr.(90%) for internal batteries only[3]		
Battery Voltage (Nominal)	288 VDC		
Output Characteristics			
Output Voltage	Single-phase, 240/208/120 volts		
Output Voltage Regulation	= ±3%		
Output Frequency	±0.5Hz/1.0Hz/1.5Hz (factory/authorized service center selectable only)		
AUTO/MAN Frequency	Factory or authorized service center selectable only		
Voltage THD	< 3% for linear load; < 6% for non-linear load		
Common-Mode Noise	< .5 Vrms		
Rated Load Power Factor[1]	0.85 (0.6 - 1.0) lagging		
Efficiency (AC-DC-AC)	>86% [4]		
Voltage Transient	< ±8% (Load of 0 to 100 %)		
Voltage Transient Recovery	50 ms to within 2% of nominal		
Rated Output Current (rms)	58 A	75 A	91.6 A
Max Peak Output Current	174 A	225 A	275 A
Inverter Overload Capacity	125%-30 sec./150%-10 sec		
Bypass Overload Capacity	125%-10 min./1000%-1 cycle		
Crest Factor	3.0		

1. **Input/output figures rated for 240 volts unless otherwise stated. Output ratings given for 0.85PF are only valid when the input voltage is greater than 204 volts; otherwise, ratings given for 0.70PF are applicable.**
2. Battery backup time may vary depending on the operating conditions and ambient temperature at the installation site.
3. An initial charge time of 24 hrs. is necessary to obtain proper battery performance level before unit is placed in operation.
4. Subject to update without notice.
5. Derate to 18.7 kVA (15.9 kW) for 50 Hz operation.

STANDARD MODELS: 14 – 22 KVA (CONT'D)

Capacity	14 kVA (11.9 kW)[1]	18 kVA (15.3 kW)[1]	22 kVA (18.7 kW)[1, 4]
Environment			
Operating Temperature 59 – 77 °F (15 – 25 °C) Recommended	60 Hz 32 – 104 °F (0 – 40 °C) 50 Hz 32 – 91 °F (0 – 33 °C)		
Storage Temperature	-4 – 104 °F (-20 – 40 °C)		
Installation Area	To be installed in a well ventilated area free of airborne dust, metal particles or flammable gas, allow at least 4 inches on all sides		
Operating Humidity	30 – 90% (no condensation)		
Altitude	< 6600 ft. (2000 m) above sea level [2]		
Acoustical Noise	50 dB (A) maximum @ 1 meter from front panel		
Heat Generation (Typical)	6610 BTU/Hr[3]	8499 BTU/Hr[3]	10,387 BTU/Hr[3]
Operation Diagnosis			
Battery Check	Performed on start up, by schedule, on-demand (user configurable)		
Input OV Protection	Standard		
Battery Lifetime	UPS calculates battery replacement time based upon battery ambient temperature (LCD display, LED and beeps)		
Internal Temperature	UPS gives indication of internal temperature, alarm when high temp		
Event Data Storage	32 – Operation, 32 – Backup, 32 - Warnings, 32 – Faults, 32 - Test, 32 - System		
Applications			
Switches	Generator compatible		
Bypass Switch			
Bypass Disable	Static switch <1/4 cycle (50Hz: 5 ms/60Hz: 4.16 ms)		
Automatic Retransfer	Factory or authorized service center selectable only		
Interface/Communications			
Real Time clock	Real Time Clock with backup Lithium Ion Battery		
Schedule Operation	Schedule ON/OFF operation of UPS using optional RemotEye III communication software		
Autostart	Automatic UPS Startup when AC is applied - Option can be enabled or disabled at user's discretion		
Remote ON/OFF	Standard – External terminal		
LED Display	3 LED's indicating On-Line/Fault, Warning, and A/C Input		
Operator Interface	Interactive Touchscreen		
Buzzer Volume	Standard (Fixed Volume)		
Power Connections	Standard – Hard wire		
Emergency Power Off	Standard – Terminal contacts only		
Remote Contacts	Standard (INV, BYP, BATT, LB, AC, FLT)		
RS232 ASCII Interface	Toshiba UPS Communication Protocol 2.0		

1. **Input/output figures rated for 240 volts unless otherwise stated. Output ratings given for 0.85PF are only valid when the input voltage is greater than 204 volts; otherwise, ratings given for 0.70PF are applicable.**
2. At 6600 ft (2000 m) above sea level, output capacity should be derated by 3%
3. Subject to update without notice.
4. Derate to 18.7 kVA (15.9 kW) for 50 Hz operation.

STANDARD MODELS: 14 – 22 KVA (CONT'D)

Capacity	14 kVA (11.9 kW)[1]	18 kVA (15.3 kW)[1]	22 kVA (18.7 kW) [1, 2]
Mechanical Design			
Enclosure	Enclosure of unit made from sheet metal meeting NEMA1 and UL		
Size (HxWxD) (max)	39.0 x 17.5 x 36.1 in. (991 x 445 x 917 mm)		
Paint System	Powder coating		
Fan Panel	Panel mounted on back of UPS to allow for easy replacement of fans		
Battery System			
Battery Replacement	Slide out battery packs accessible from front of UPS, factory or authorized service center serviceable only		
Battery Packs	Designed for battery acid leakage containment with (6) batteries per pack		
Battery Pack Size (HxWxD) max.	5.0 x 7.3 x 19.0 in. (127 x 185 x 462 mm)		
Battery Pack Quantity	8		
Battery Manufacturer	YUASA		
Battery Type	REW45-12FR		
Toshiba Part Number for Battery Pack	51896-FS		60995-FS

1. **Input/output figures rated for 240 volts unless otherwise stated. Output ratings given for 0.85PF are only valid when the input voltage is greater than 204 volts; otherwise, ratings given for 0.70PF are applicable.**
2. Derate to 18.7 kVA (15.9 kW) for 50 Hz operation.

Appendix B: 1600XP Command Parameter Table

1600XP Command Parameters Table							
Cmd ID	Description on LCD	Brief Description	Location Map		Example	Rqd Security Level to change	By
			Tab	Block			
001	Manufacturer	UPS Manufacturer - Stores up to 16 characters.	Settings	ID	TOSHIBA	Nonchangeable Nonchangeable Changeable	User Administrator Service
002	Typeform*	UPS Typeform	Settings	ID	UH3B2B060C6	Nonchangeable Nonchangeable Changeable	User Administrator Service
003	Serial No.	UPS Serial Number	1. Main 2. Set-tings	ID	20080112345	Nonchangeable Nonchangeable Changeable	User Administrator Service
004	Main FWare Ver	Main Firmware Version - The last 5 digit represents Main Controller's software version. In this example, the version is 1.000	Settings	ID	UH3MSW01000	Nonchangeable Nonchangeable Nonchangeable	User Administrator Service
005	Main BSector Ver	Main Bootsector Version - The last 5 digit represents Main Controller's Bootsectior Version. In this example, the ver-sion is 1.000	Settings	ID	UH3MBS01000	Nonchangeable Nonchangeable Nonchangeable	User Administrator Service
006	Main BLoader Ver	Main Bootloader Version - The last 5 digit represents Main Controller's Bootloader software version. In this example, the version is 1.000	Settings	ID	UH3MBL01000	Nonchangeable Nonchangeable Nonchangeable	User Administrator Service
007	Job No.	Job Number - Toshiba's manufacturing job number.	Settings	ID	JB0123456789	Nonchangeable Nonchangeable Changeable	User Administrator Service
008	Test Person	Test Person's First and Last Initial	Settings	ID	TA	Nonchangeable Nonchangeable Changeable	User Administrator Service
009	Test Date	UPS Test Date at the Production - Format is YYYYMMDD	Settings	ID	20080101	Nonchangeable Nonchangeable Changeable	User Administrator Service
010	HWare Built Date	Hardware Built Date - Format is YYYYMMDD	Settings	ID	20080101	Nonchangeable Nonchangeable Changeable	User Administrator Service

1600XP Command Parameters Table							
Cmd ID	Description on LCD	Brief Description	Location Map		Example	Rqd Security Level to change	By
			Tab	Block			
011	Main Firmware Build Date	Firmware Build Date - Format is Mmm DD, YYYY	Settings	ID	Jan 04, 2006	Nonchangeable	Service
012	Main Firmware Build Time	Main Firmware Build Time - Formate HH:MM:SS	Settings	ID	18:45:45	Nonchangeable	Service
013	Main EEPROM Ver	Main EEPROM Version	Settings	ID		Nonchangeable Nonchangeable Nonchangeable	User Administrator Service
015	System Name	System Name	Settings	ID	TOSHIBA H3, Control Plant	Nonchangeable Changeable Changeable	User Administrator Service
016	Attached Device	UPS Attached Devices	Settings	ID	NONE	Nonchangeable Changeable Changeable	User Administrator Service
017	Installed Date	UPS Installed Date at end user site	Settings	ID	20080101	Nonchangeable Changeable Changeable	User Administrator Service
018	CRC Check-sum	CRC Checksum	Settings	ID		Nonchangeable	Service
019	Ftest Date	Functional Test Date	Settings	ID	20080101	Changeable	Service
020	Ftest File	Functional Test File	Settings	ID	“NO”	Changeable	Service
102	No of Input Line	No of Input Lines - Always 1 input line for 1600XP series	Setting	IN	1 Line	Nonchangeable Nonchangeable Changeable	User Administrator Serivce
111	Rated Vin	Rated Input Voltage - Used to calculate percentage and required to setup properly at very first time startup.	Setting	IN	240 V	Nonchangeable Changeable Changeable	User Administrator Service
114	VIUV DeLevel	Input Undervoltage Detection Level	Setting	IN	240	Changeable	Service
115	VIUV ReLevel	Input Voltage Warning Recovery Level	Setting	IN	70%	Changeable	Service
116	VIUV Gradient	Used to calculate Undervolatage detection and recovery level.	Setting	IN	6	Changeable	Service
117	VIUV Hysterisis	Used to calculate Undervolatage detection and recovery level.	Setting	IN	8	Changeable	Service
118	VIUV Section	Used to calculate Undervolatage detection and recovery level.	Setting	IN	230	Changeable	Service

1600XP Command Parameters Table							
Cmd ID	Description on LCD	Brief Description	Location Map		Example	Rqd Security Level to change	By
			Tab	Block			
119	VIOV DeLevel	Input Overvoltage Detection Level - Of rated input voltage which was configured with Command ID 111.	Setting	IN	274 V	Nonchangeable Nonchangeable Changeable	User Administrator Service
120	VIOV ReLevel	Input Overvoltage Recovery Level - Of rated input voltage which was configured with Command ID 111.	Setting	IN	264 V	Nonchangeable Nonchangeable	User Administrator
121	Vin Gain	Used to convert AD value to actual value	Setting	IN	6720	Changeable	Service
122	Vin Offset	Feedback Offset adjustment due to hardware and software AD converter's offset	Setting	IN	0	Changeable	Service
124	Iin Gain	Used to convert AD value to actual value	Setting	IN	5241	Changeable	Service
125	Iin Offset	Feedback Offset adjustment due to hardware and software AD converter's offset.	Settings	IN	0	Changeable	Service
127	Iin 100%	100% Input Current Amount	Settings	IN	250	Changeable	Service
128	Iref Phase Adj	Time delay adjustment to sync the phase of input voltage and current due to hardware and software delay.	Settings	IN	17500	Changeable	Service
141	Freq on FIERR*	Freq setup on input frequency error - Toshiba UPS try to detect input frequency but very tiny percentage when UPS can not detect the input frequency because of fluctuation, 1600XP UPS will start by using this setup.	Setting	IN	60.0 Hz	Nonchangeable Changeable Changeable	User Administrator Service
202	No of Output Line	No of Output Lines - Always 1 input line for 1600XP series	Setting	OUT	1 Line	Nonchangeable Nonchangeable Changeable	User Administrator Service
215	Rated Vout*	Rated Output Voltage - Must be setup properly at initial startup. Rated output voltage is used to calculate percentages for ID 220, 222	Setting	OUT	240 V	Nonchangeable Changeable Changeable	User Administrator Service
216	Rated Iout	Rated Output Current - UPS calculated rated output current from typeform command id 002.	Monitor	OUT	25.0 A	Nonchangeable Nonchangeable Changeable	User Administrator Service
220	VOUV De-Level*	Output Undervoltage Detection Level in Percentage - Of rated output voltage which was configured with Command ID 215.	Setting	OUT	90 %	Nonchangeable Nonchangeable Changeable	User Administrator Service

1600XP Command Parameters Table							
Cmd ID	Description on LCD	Brief Description	Location Map		Example	Rqd Security Level to change	By
			Tab	Block			
222	VOOV De-Level*	Output Overvoltage Detection Level in percentage - Of rated output voltage which was configured with Command ID215	Setting	OUT	110 %	Nonchangeable Nonchangeable Changeable	User Administrator Service
224	Fo Syn Window*	Output Frequency Synchronization Window	Setting	OUT	1.0 Hz	Nonchangeable Nonchangeable Changeable	User Administrator Service
225	Fo Slew Rate	Output Frequency Slew Rate	Setting	OUT	10	Changeable	Service
226	Vout Adjust	Output Voltage Adjustment - Can adjust up to +/- 5 increment of one in order to increase or decrease output voltage to compensate line voltage drop.	Setting	OUT	0	Nonchangeable Changeable Changeable	User Administrator Service
227	Iout 100% Amount	Output Current 100% Amount	Setting	OUT	250	Changeable	Service
228	OOL Delevel	Output Overload Warning/Fault Detection Level in percentage	Setting	OUT	110	Changeable	Service
229	OOL DeDelay	Output Overload Warning/Fault Detection Delay at 125% @25°	Setting	OUT	30	Changeable	Service
230	OOL ReLevel	Output Overload Warning Recovery Delay	Setting	OUT	105	Changeable	Service
231	OOL ReDelay	Output Overload Warning Recovery Delay	Setting	OUT	160	Changeable	Service
232	Vout Comp. Step	Output Voltage will be compensated according to this setup and current percentage	Setting	OUT	20	Changeable	Service
233	Vout Gain	Use this value to convert AD value to Actual Value	Setting	OUT	7987	Changeable	Service
234	Vout Offset	Feedback Offset adjustment due to hardware and software components	Setting	OUT	0	Changeable	Service
242	Iout Gain	At 240VAC use this value to convert AD VAlue to Actual Value	Setting	OUT	1131	Changeable	Service
243	Iout Offset	Feedback Offset adjustment due to hardware and software compenents.	Setting	OUT	0	Changeable	Service
251	Vref PhAdj 60Hz	Time delay adjustment to sync the actual phase of output and plotting.	Setting	OUT	-8	Changeable	Service
254	Vref Amplitude	Calibrated no Load Output Voltage	Setting	OUT	246	Changeable	Service

1600XP Command Parameters Table							
Cmd ID	Description on LCD	Brief Description	Location Map		Example	Rqd Security Level to change	By
			Tab	Block			
256	DC-AC Efficiency	DC to AC Efficiency	Setting	OUT	81	Changeable	Service
261	Rated PFactor	Calculated from Typeform and Rated Voltage	Monitor	OUT	85	Nonchangeable Nonchangeable Changeable	User Administrator Service
262	AC-AC Efficiency	AC-AC Efficiency	Setting	OUT	85	Changeable	Service
267	Vref PhAdj 50Hz	Output Voltage Reference Phase Adjustment for 50 Hz	Setting	OUT	-7	Changeable	Service
268	Cnv/Xfmer Lmt	Power calculation is limited by converter or transformer	Setting	OUT	0	Changeable	Service
271	Comp. Ainv	Inverter Mode A Compensation	Setting	OUT	2	Changeable	Service
272	Comp. Binv	Inverter Mode B Compensation	Setting	OUT	10	Changeable	Service
273	Comp. Cinv	Inverter Mode C Compensation	Setting	OUT	0	Changeable	Service
274	Comp. Abyp	Bypass Mode A Compensation	Setting	OUT	3	Changeable	Service
275	Comp. Bbyp	Bypass Mode B Compensation	Setting	OUT	7	Changeable	Service
276	Comp. Cbyp	Bypass Mode C Compensation	Setting	OUT	1	Changeable	Service
277	OL Time Wndw	Overload Time Window	Setting	OUT	10	Changeable	Service
278	Rated OutXfmr (P)	Rated Output Primary Transformer	Setting	OUT	230	Changeable	Service
279	50Hz Derating	50Hz Derating	Setting	OUT	100	Changeable	Service
280	60Hz Derating	60Hz Derating	Setting	OUT	100	Changeable	Service
302	No Of Bypass Line	No of Bypass Lines - Always 1 input line for 1600XP series	Setting	BYP	1 Line	Nonchangeable Nonchangeable Changeable	User Administrator Service
315	VBypUV DeLevel*	Bypass Undervoltage Detection Level - Percentage of rated input voltage command ID 111.	Setting	BYP	62 %	Nonchangeable Nonchangeable Changeable	User Administrator Service
316	VBypUV ReLevel*	Bypass Undervoltage Recovery Level in percentage - Of rated input voltage command ID 111.	Setting	BYP	66 %	Nonchangeable Nonchangeable Changeable	User Administrator Service
317	VBypOV DeLevel	Bypass Over Voltage Detection Level in Volt	Setting	BYP	284 V	Nonchangeable Nonchangeable Changeable	User Administrator Service

1600XP Command Parameters Table							
Cmd ID	Description on LCD	Brief Description	Location Map		Example	Rqd Security Level to change	By
			Tab	Block			
318	VBypOV ReLevel	Bypass Over Voltage Recovery Level in Volt	Setting	BYP	274 V	Nonchangeable Nonchangeable Changeable	User Administrator Service
320	BypOL DeDelay	Bypass Overload Fault Detection Delay at 125% @ 25°C	Setting	BYP	600	Changeable	Service
404	Rated DC Bus*	Rated DC Bus Voltage - Used to calculated percentage.	Setting	DC	770 Vdc	Nonchangeable Nonchangeable Changeable	User Administrator Service
405	DCOV Delevel	DC Bus Overvoltage Fault Detection Level Percentage	Setting	DC	110	Changeable	Service
406	DCUV DeLevel	DC Bus Undervoltage Fault Detection Level	Setting	DC	83	Changeable	Service
409	DCIB DeLevel	DC Bus Imbalance Fault Detection Level Percentage.	Setting	DC	11	Changeable	Service
415	VdcP Gain	Use this value to convert AD value to Actual value	Setting	DC	7947	Changeable	Service
416	VdcP Offset	Feedback Offset adjustment due to hardware and software components.	Setting	DC	0	Changeable	Service
418	VdcN Gain	Use this value to convert AD value to Actual value.	Setting	DC	7947	Changeable	Service
419	VdcN Offset	Feedback Offset adjustment due to hardware and software components.	Setting	DC	0	Changeable	Service
431	SoftCharge Time	DC Bus Soft charging time	Setting	DC	5	Changeable	Service
432	hardCharge Time	DC Bus Hard charging time.	Setting	DC	360	Changeable	Service
436	Calibrated DCRef	Calibrated DC Bus Reference	Setting	DC	100	Changeable	Service
438	AC/DC Ref	ACDC reference	Setting	DC	288	Changeable	Service
439	Ii Ref Offset	Input Current Reference Offset Adjustment	Setting	DC	0	Changeable	Service
440	DCUV SW DeDelay	DC Undervoltage detection delay	Setting	DC	2	Changeable	Service
441	DCOV SW DeDElay	DC Overvoltage detection delay	Setting	DC	2	Changeable	Service

1600XP Command Parameters Table							
Cmd ID	Description on LCD	Brief Description	Location Map		Example	Rqd Security Level to change	By
			Tab	Block			
442	DCUB SW DeDelay	DCUB Detection Delay	Setting	DC	2	Changeable	Service
504	Battery Capacity	Battery Capacity	Setting	BATT	0	Nonchangeable Changeable Changeable	User Administrator Service
507	Total Discharges	Number of Battery Discharges - Increment count by one after UPS in Backup mode for 10 seconds	Settings	BATT	123	Nonchangeable Changeable Changeable	User Administrator Service
509	Batt Life Remain	Battery Lifetime Remaining	Settings	BATT	43800 Hr	Nonchangeable Changeable Changeable	User Administrator Service
511	Rated Ahr*	Rated Battery Ampere Hour - One of the battery's properties	Settings	BATT	9 AHr	Nonchangeable Changeable Changeable	User Administrator Service
512	No Batt(Series)*	Number of Battery in Series	Settings	BATT	18	Nonchangeable Changeable Changeable	User Administrator Service
513	No Batt(Paral)*	Number of Battery in Parallel	Settings	BATT	1	Nonchangeable Changeable Changeable	User Administrator Service
514	Batt Ins Date	Battery installation Date - YYYY/MM/DD format	Settings	BATT	2008/01/01	Nonchangeable Changeable Changeable	User Administrator Service
516	Batt SDown Level*	Battery Shutdown Level - Percentage setting for shutdown level calculated. Actual shutdown level might be different depends on the rate of discharge	Settings	BATT	79 %	Nonchangeable Nonchangeable Changeable	User Administrator Service
524	SbatEx	External Battery Status	Settings	BATT	Disable	Nonchangeable Changeable Changeable	User Administrator Service
525	Ex # Batt (Series)	Number of External Battery in Series	Settings	BATT	18	Nonchangeable Changeable Changeable	User Administrator Service
526	Ex # Batt (Parallel)	Number of External Battery in Parallel	Settings	BATT	1	Nonchangeable Changeable Changeable	User Administrator Service

1600XP Command Parameters Table							
Cmd ID	Description on LCD	Brief Description	Location Map		Example	Rqd Security Level to change	By
			Tab	Block			
527	Ex Batt Rated Ahr	External battery's Rated Ampere-Hour capacity	Settings	BATT	9 AHr	Nonchangeable Changeable Changeable	User Administrator Service
528	Ex Batt C Rate	External Battery C rate	Settings	BATT	0 C	Nonchangeable Changeable Changeable	User Administrator Service
529	Ex Batt Ins Date	External Battery Installation Date	Settings	BATT	01/01/2008	Nonchangeable Changeable Changeable	User Administrator Service
532	Vbat Gain	Battery Voltage Gain	Setting	BATT	8298	Changeable	Service
533	Vbat Offset	Battery Voltage Offset	Setting	BATT	0	Changeable	Service
544	Charger Ref(Norm)	Charger Reference (Normal Charging Mode)	Setting	BATT	55	Changeable	Service
545	Low Batt Level*	Low Battery Level in Percentage - Percentage of nominal (# battery in series * 12 Vdc) will issue low battery warning during Backup	Settings	BATT	90 %	Nonchangeable Nonchangeable Changeable	User Administrator Service
546	VChrgOV De-Delay	Battery Overvoltage Fault Detection Delay - Configurable between 0 to 300 Sec	Settings	BATT	60 Sec	Nonchangeable Nonchangeable Changeable	User Administrator Service
548	Charger Ref(Prev)	Charger Reference (Preventive Chargin Mode)	Settings	BATT	150	Changeable	Service
550	CHRGOV DeLevel	Charger Overvoltage Detection Level	Settings	BATT	117	Changeable	Service
551	CHRGOV WrnDeDelay	Charger Overvoltage warning detection delay	Settings	BATT	8	Changeable	Service
552	CHRGOV WrnReDelay	Charger Overvoltage warning recovery delay	Settings	BATT	1	Changeable	Service
553	CHRGOV FltDeDelay	Charger Overvoltage fault detection delay	Settings	BATT	1	Changeable	Service
554	En ChrgCtler	Enable Charger controller	Settings	BATT	1	Changeable	Service
555	Restart ChrgCler	Restart Charger controller	Settings	BATT	0	Changeable	Service
556	Ibatt Multiplier	Battery Curretn Multiplier	Settings	BATT	12	Changeable	Service

1600XP Command Parameters Table							
Cmd ID	Description on LCD	Brief Description	Location Map		Example	Rqd Security Level to change	By
			Tab	Block			
557	Offset AH Cap 1	Offset amp hour at 1 C disharge rate	Settings	BATT	22	Changeable	Service
558	Offset AH Cap 2	Offset amp hour at 2 C disharge rate	Settings	BATT	29	Changeable	Service
559	Offset AH Cap 3	Offset amp hour at 3 C disharge rate	Settings	BATT	36	Changeable	Service
560	Offset AH Cap 4	Offset amp hour at 4 C disharge rate	Settings	BATT	39	Changeable	Service
561	BattV at C Rate 1	Battery Voltage at 1 C discharge rate	Settings	BATT	120	Changeable	Service
562	BattV at C Rate 2	Battery Voltage at 2 C discharge rate	Settings	BATT	118	Changeable	Service
563	BattV at C Rate 3	Battery Voltage at 3 C discharge rate	Settings	BATT	114	Changeable	Service
564	BattV at C Rate 4	Battery Voltage at 4 C discharge rate	Settings	BATT	113	Changeable	Service
565	True Discharge C	True battery discharge capacity	Settings	BATT	7500	Changeable	Service
566	Battery mAh In	Battery mAh In	Settings	BATT	0	Nonchangeable Changeable	Administrator Service
567	Batt Charge Time	Time to fully charge battery	Settings	BATT	1440	Changeable	Service
568	mAh Lost Slope	Milliamp hour lost in one month	Settings	BATT	38	Changeable	Service
569	Total mAh Lost	Total milliamp hour lost	Settings	BATT	0	Changeable	Service
609	Requested State	Requested UPS State	Main Settings	RUN/ STOP C&C	On-Line	Changeable Changeable Changeable	User Administrator Service
610	Timed Opera-tion	Timed Operation Request - Count down timer to switch UPS operations	Settings	C&C	On-Line	Changeable Changeable Changeable	User Administrator Service
611	EPO Status	Emergency Power Off Status	Monitor	C&C	Open		

1600XP Command Parameters Table							
Cmd ID	Description on LCD	Brief Description	Location Map		Example	Rqd Security Level to change	By
			Tab	Block			
612	Faults	UPS Faults - UPS Faults decoded at footer fault/s field or Setting Tab in hex format	Footer: Setting	Fault/s Field : C&C	DVCOH 0X00000008	Changeable Changeable Changeable	User Administrator Service
613	Warnings	UPS Warnings - UPS Warnings decoded at footer warning/s field or Setting Tab in hex format	Footer: Setting	Warning/s Field : C&C	VIOV 0X00000001	Nonchangeable Nonchangeable Changeable	User Administrator Service
619	Security Level	Security Level - Change the password with this command ID to have different level of security	Settings	C&C	USER, ADMIN	Changeable Changeable Changeable	User Administrator Service
620	Manage Admin PW	Manage Admin Password - Default is ADMIN	Settings	C&C	ADMIN	Changeable Changeable	Administrator Service
621	Reset Admin PW	Reset Admin Password - Restore administrator's password to default ADMIN	Settings	C&C	Idle	Changeable Changeable Changeable	User Administrator Service
623	En Bypass*	Decides the system's bypass availability	Settings	C&C	Enabled	Changeable	Service
624	En Asyn Byp	When disabled, the UPS will not prevent transfers to bypass mode during periods when the frequencies are out of sync.	Settings	C&C	Enabled	Changeable	Service
625	En CVCF*	Constant Voltage, Constant Frequency Mode	Settings	C&C	Enabled	Changeable	Service
626	CVCF Frequency*	500 or 600 all other values will default to 500 systems.	Settings	C&C	600	Changeable	Service
634	UPS Date	UPS Real Time Date (Battery Backup) - Follow the same format as display shows (Mon 10/05/2009)	Settings	C&C	Mon 10/05/2009	Changeable Changeable Changeable	User Administrator Service
635	UPS Time	UPS Real Time (Battery Backup) - Use the same format as display shows (12 hour format)	Settings	C&C	11:46 AM	Changeable Changeable Changeable	User Administrator Service
636	Timestamp	UPS Real Time Date and Time Stamp - Used for recording feature	Monitor	C&C	0X268AB487		
637	En REye UPS Ctl	Enable REye UPS Control - Enable or disable RemoteEye Network Card to control UPS modes	Settings	C&C	Enable	Nonchangeable Changeable Changeable	User Administrator Service

1600XP Command Parameters Table							
Cmd ID	Description on LCD	Brief Description	Location Map		Example	Rqd Security Level to change	By
			Tab	Block			
639	En Startup Delay*	Enable Startup Time Delay - Non-volatile configuration. Default from factory is Disable.	Settings	C&C	Disable	Nonchangeable Changeable Changeable	User Administrator Service
640	Startup Mode*	Startup UPS Mode - Non-volatile configuration. Default from factory is Bypass. It can be changed to On-Line.	Settings	C&C	Bypass	Nonchangeable Changeable Changeable	User Administrator Service
641	Startup Delay*	Startup Time Delay in Second - Non-volatile configuration. Default from factory is zero. You can configure up to 800 Seconds.	Settings	C&C	0 Sec	Nonchangeable Changeable Changeable	User Administrator Service
645	Mode of Rmt SDown	Mode of Remote Shutdown - Non-volatile configuration. When remote contact is close, it could go to bypass or shutdown.	Settings	C&C	Shutdown	Nonchangeable Changeable Changeable	User Administrator Service
646	En DCntct LANSD	Enable Dry Contact LAN Shutdown - Non-volatile configuration. Default from factory is Enable.	Settings	C&C	Enable	Nonchangeable Changeable Changeable	User Administrator Service
647	DCntct LANSD Wndw	Time Window of LAN Shutdown - Non-volatile configuration. Default from factory is 600 Seconds	Settings	C&C	600 Sec	Nonchangeable Changeable Changeable	User Administrator Service
648	BK DContact Delay	Time Delay Remote Contact On Backup - Non-volatile configuration. Time delay for Backup dry contact will be on after UPS goes to Backup Mode. Default from factory is 10 Sec	Settings	C&C	10 Sec	Nonchangeable Changeable Changeable	User Administrator Service
649	LB DContact Delay	Time Delay Remote Contact On Low Battery - Non-volatile configuration. Time delay for Low Battery dry contact will be on after UPS detects Low Battery warning. Default from factory is 0 Sec	Settings	C&C	0 Sec	Nonchangeable Changeable Changeable	User Administrator Service
652	En Batt Test Sup*	Enable Battery Test at UPS Startup - Non-volatile configuration. Default from factory is Disable	Settings	C&C	Disable	Nonchangeable Changeable Changeable	User Administrator Service
653	En Batt Test*	Enable or Disable Battery Test - Non-volatile configuration. Default from factory is Enable.	Settings	C&C	Enable	Nonchangeable Changeable Changeable	User Administrator Service

1600XP Command Parameters Table							
Cmd ID	Description on LCD	Brief Description	Location Map		Example	Rqd Security Level to change	By
			Tab	Block			
655	Batt Test Freq*	Max Battery Test Frequency - Non-volatile configuration. Default from factory is Monthly.	Settings	C&C	Monthly	Nonchangeable Changeable Changeable	User Administrator Service
656	Sys. Temp. Comp.	System Temperature Compensation	Settings	C&C	-5	Changeable	Service
657	Service Port Mode	Service Port Mode - Terminal or TUPS 2.0	Settings	C&C	1	Changeable	Service
658	En Restart	Enable Restart - Non-volatile configuration. After shutdown by battery, UPS will restart if input power recover. Default from factory is Enable.	Settings	C&C	Enable	Nonchangeable Changeable Changeable	User Administrator Service
659	Restart Delay	Restart Delay	Settings	C&C	10 Sec	Nonchangeable Changeable Changeable	User Administrator Service
660	En AutoXfer	Enable Auto Transfer - Non-volatile configuration. Enable auto transfer when current limit occurs. It will switch bypass and On-Line mode.	Settings	C&C	Enable	Nonchangeable Changeable Changeable	User Administrator Service
662	AutoXfer Window	Auto Transfer Time Window - Non-volatile configuration. Default from factory is 3 Seconds.	Settings	C&C	3 Sec	Nonchangeable Changeable Changeable	User Administrator Service
663	Srv Port Baud*	Service Port Baud Rate - Non-volatile configuration. Default from factory is 57600.	Settings	C&C	57600	Nonchangeable Changeable Changeable	User Administrator Service
680	Reload All EE*	Reload all EEPROM	Settings	C&C	0	Changeable	Service
681	SNMP Port Mode	SNMP Port Mode: Terminal or Toshiba 2.0	Settings	C&C	1	Changeable	Service
682	Special Purpose	(Call Factory for Further Information)	Settings	C&C		Nonchangeable Nonchangeable Changeable	User Administrator Service
683	Flt Clear Mask Lo	Fault Clear Mask Low	Settings	C&C	0x0000	Changeable	Service
684	Flt Clear Mask Hi	Fault Clear Mask High	Settings	C&C	0x0000	Changeable	Service

1600XP Command Parameters Table							
Cmd ID	Description on LCD	Brief Description	Location Map		Example	Rqd Security Level to change	By
			Tab	Block			
685	Total Flt Allowed	Total Faults Allowed	Settings	C&C	10	Changeable	Service
686	Flt Dis Time	Fault Disable Time	Settings	C&C	10	Changeable	Service
693	Invert Rmt SDown	Remoted Shutdown Inverted Logic - Non-volatile configuration. Default from factory is Normally Open	Settings	C&C	Normally Open	Nonchangeable Changeable Changeable	User Administrator Service
694	Reset HW Fault	Reset Hardware Fault Latch	Settings	C&C	0	Changeable	Service
695	Restart Mode*	Restart UPS Mode - Non-volatile configuration. Default from factory is On-Line	Settings	C&C	On-Line	Nonchangeable Changeable Changeable	User Administrator Service
696	SWMishap Mrstrt	Software Mishap restart mode	Settings	C&C	1	Changeable	Service
697	Special Purpose	(Call Factory for Further Information)	Settings	C&C		Changeable Changeable	Administrator Service
701	System Op Time	Total System Operation Time - Non-volatile history record. Default from factory is zero.	Settings	HIST	123 Sec	Nonchangeable Nonchangeable Changeable	User Administrator Service
702	Inverter Op Time	Total Inverter Operation Time - Non-volatile history record. Default from factory is zero.	Settings	HIST	123 Sec	Nonchangeable Nonchangeable Changeable	User Administrator Service
703	Backup Op Time	Total Backup Operation Time - Non-volatile history record. Default from factory is zero.	Settings	HIST	123 Sec	Nonchangeable Nonchangeable Changeable	User Administrator Service
704	UPS Lifetime	UPS Lifetime Remaining Time - Non-volatile history record. Default from factory is 61320 Hour	Settings	HIST	61320 Hr	Nonchangeable Nonchangeable Changeable	User Administrator Service
705	Hi System Temp	Highest System Temperature Recorded - Non-volatile history record. Default from factory is 0 C.	Settings	HIST	0 C	Nonchangeable Nonchangeable Changeable	User Administrator Service
706	Hi Battery Temp	Highest Ambient Temperature Recorded - Non-volatile history record. Default from factory is -15 C.	Settings	HIST	-15	Nonchangeable Nonchangeable Changeable	User Administrator Service

1600XP Command Parameters Table							
Cmd ID	Description on LCD	Brief Description	Location Map		Example	Rqd Security Level to change	By
			Tab	Block			
707	Total VIUVs	Total No. Of Input Undervoltage - Non-volatile history record. Default from factory is 0.	Settings	HIST	0	Nonchangeable Nonchangeable Changeable	User Administrator Service
708	Total OLs	Total No. Of Overload - Non-volatile history record. Default from factory is 0.	Settings	HIST	0	Nonchangeable Nonchangeable Changeable	User Administrator Service
709	Total Tests	Total No. Of Tests - Non-volatile history record. Default from factory is 0	Settings	HIST	0	Nonchangeable Nonchangeable Changeable	User Administrator Service
710	Test Record	Test Record - Detail View at Record Tab	Settings	HIST		Nonchangeable Nonchangeable Nonchangeable	User Administrator Service
711	Total Backups	Total No. Of Backup - Non-volatile history record. Default from factory is 0	Settings	HIST	0	Nonchangeable Nonchangeable Changeable	User Administrator Service
712	Backup Record	Backup Record - View at Record Tab	Settings	HIST		Nonchangeable Nonchangeable Nonchangeable	User Administrator Service
713	Total Faults	Total No. Of Fault - Non-volatile history record. Default from factory is 0	Settings	HIST	0	Nonchangeable Nonchangeable Changeable	User Administrator Service
714	Fault Record	Fault Record - Detail View at Record Tab	Settings	HIST		Nonchangeable Nonchangeable Nonchangeable	User Administrator Service
715	Total Operations	Total No. Of Operation - Non-volatile history record. Default from factory is 0	Settings	HIST	0	Nonchangeable Nonchangeable Changeable	User Administrator Service
716	Operation Record	Operation Record - Detail View at Record Tab	Settings	HIST		Nonchangeable Nonchangeable Nonchangeable	User Administrator Service
719	Total Warnings	Total No. Of Warning	Settings	HIST	0	Nonchangeable Nonchangeable Changeable	User Administrator Service
720	Warning Record	Warning Record - Detail View at Record Tab	Settings	HIST		Nonchangeable Nonchangeable Nonchangeable	User Administrator Service

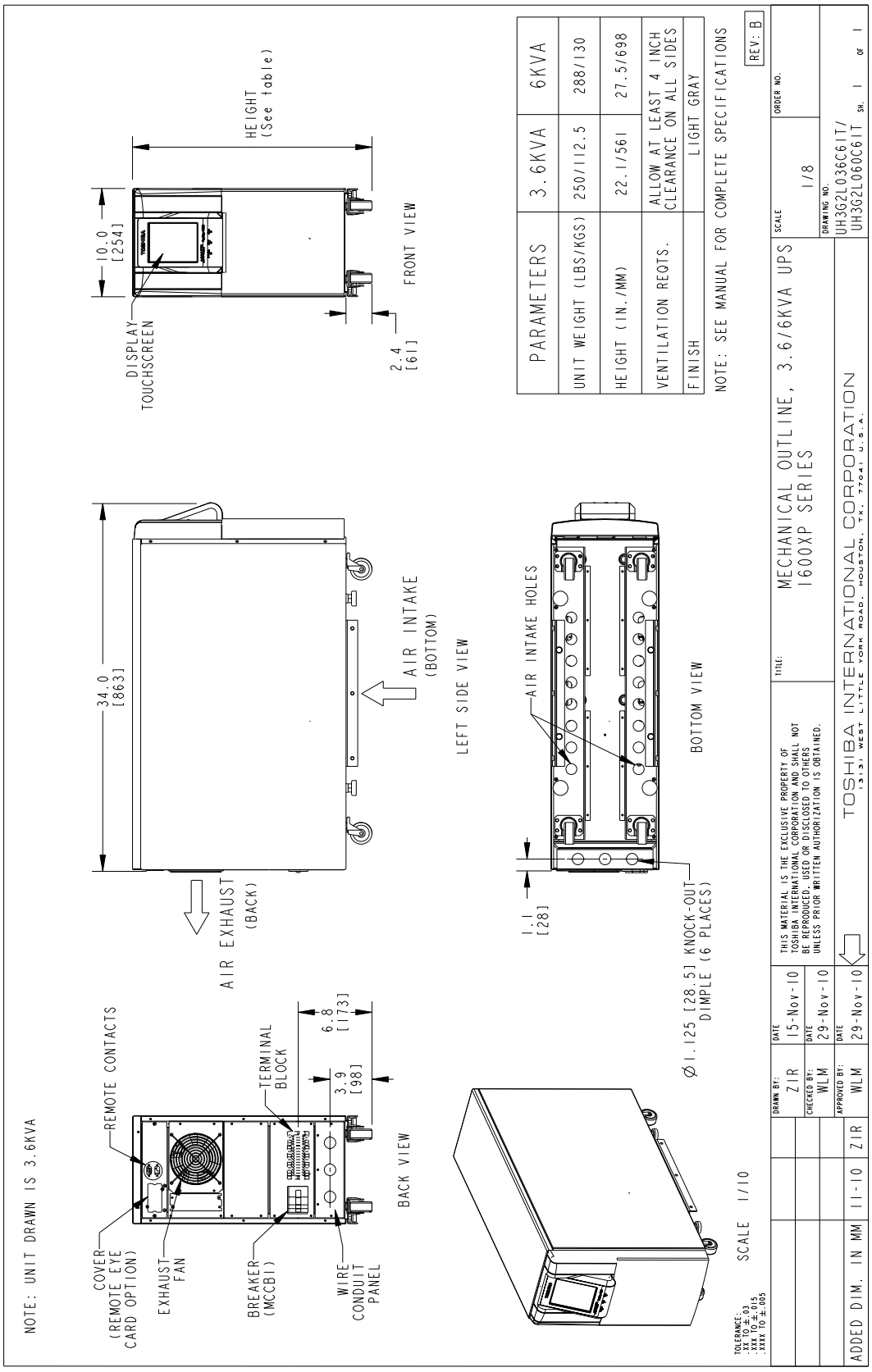
1600XP Command Parameters Table							
Cmd ID	Description on LCD	Brief Description	Location Map		Example	Rqd Security Level to change	By
			Tab	Block			
721	Total Sys Change	Total No. of System Changes	Settings	HIST	0	Nonchangeable Nonchangeable Changeable	User Administrator Service
722	Sys Change Record	System Changes Record - Detail View at Record Tab	Settings	HIST		Nonchangeable Nonchangeable Nonchangeable	User Administrator Service
725	Total Resets	Total UPS Resets Since Initial Startup	Settings	HIST	4	Nonchangeable Nonchangeable Changeable	User Administrator Service
726	Reset Record	View the reset records	Settings	HIST	See Records Tab	Nonchangeable Nonchangeable Nonchangeable	User Administrator Service
801	DFW Ver	Display Firmware Version	Settings	D&R	UH3DFV2001	Nonchangeable Nonchangeable Nonchangeable	User Administrator Service
802	DFW BDate	Display Build Date	Settings	D&R	Sep 30 2009	Nonchangeable Nonchangeable Nonchangeable	User Administrator Service
803	DFW BTime	Display Build Time	Settings	D&R	16:45:42	Nonchangeable Nonchangeable Nonchangeable	User Administrator Service
804	DBS Ver	Display Bootsector Version	Settings	D&R	UH3DBS01000	Nonchangeable Nonchangeable Nonchangeable	User Administrator Service
805	DBL Ver	Display Bootloader Version	Settings	D&R	UH3DBL01000	Nonchangeable Nonchangeable Nonchangeable	User Administrator Service
807	TMRsleep	Display Sleep Timer - Non-volatile configuration.	Settings	D&R	3 Min	Changeable Changeable Changeable	User Administrator Service
808	En buzzer	Enable buzzer - Non-volatile configuration. Default from factory is Enable	Settings	D&R	Enable	Changeable Changeable Changeable	User Administrator Service

1600XP Command Parameters Table							
Cmd ID	Description on LCD	Brief Description	Location Map		Example	Rqd Security Level to change	By
			Tab	Block			
810	Cali Disp	Enable Calibration of Touch Panel Display - If this is enabled, touch panel calibration will begin and end the user will be required to touch the target as accurately as possible	Settings	D&R	Disable	Changeable Changeable Changeable	User Administrator Service
811	P1X Cali	Point#1 X Calibration	Settings	D&R	29372	Changeable Changeable Changeable	User Administrator Service
812	P1Y Cali	Point#1 Y Calibration	Settings	D&R	29598	Changeable Changeable Changeable	User Administrator Service
813	P2X Cali	Point#2 X Calibration	Settings	D&R	3906	Changeable Changeable Changeable	User Administrator Service
814	P2Y Cali	Point#2 Y Calibration	Settings	D&R	29798	Changeable Changeable Changeable	User Administrator Service
815	P3X Cali	Point#3 X Calibration	Settings	D&R	3922	Changeable Changeable Changeable	User Administrator Service
816	P3Y Cali	Point#3 Y Calibration	Settings	D&R	3038	Changeable Changeable Changeable	User Administrator Service
817	P4X Cali	Point#4 X Calibration	Settings	D&R	29286	Changeable Changeable Changeable	User Administrator Service
818	P4Y Cali	Point#4 Y Calibration	Settings	D&R	3028	Changeable Changeable Changeable	User Administrator Service
821	1st Startup*	First time startup - If UPS is first time startup, Display will guide the user through those commands necessary to setup the UPS properly.	Settings	D&R	Disable	Changeable Changeable	Administrator Service
822	Buzzer Silent	Buzzer Silent	Settings	D&R	0	Changeable	Service

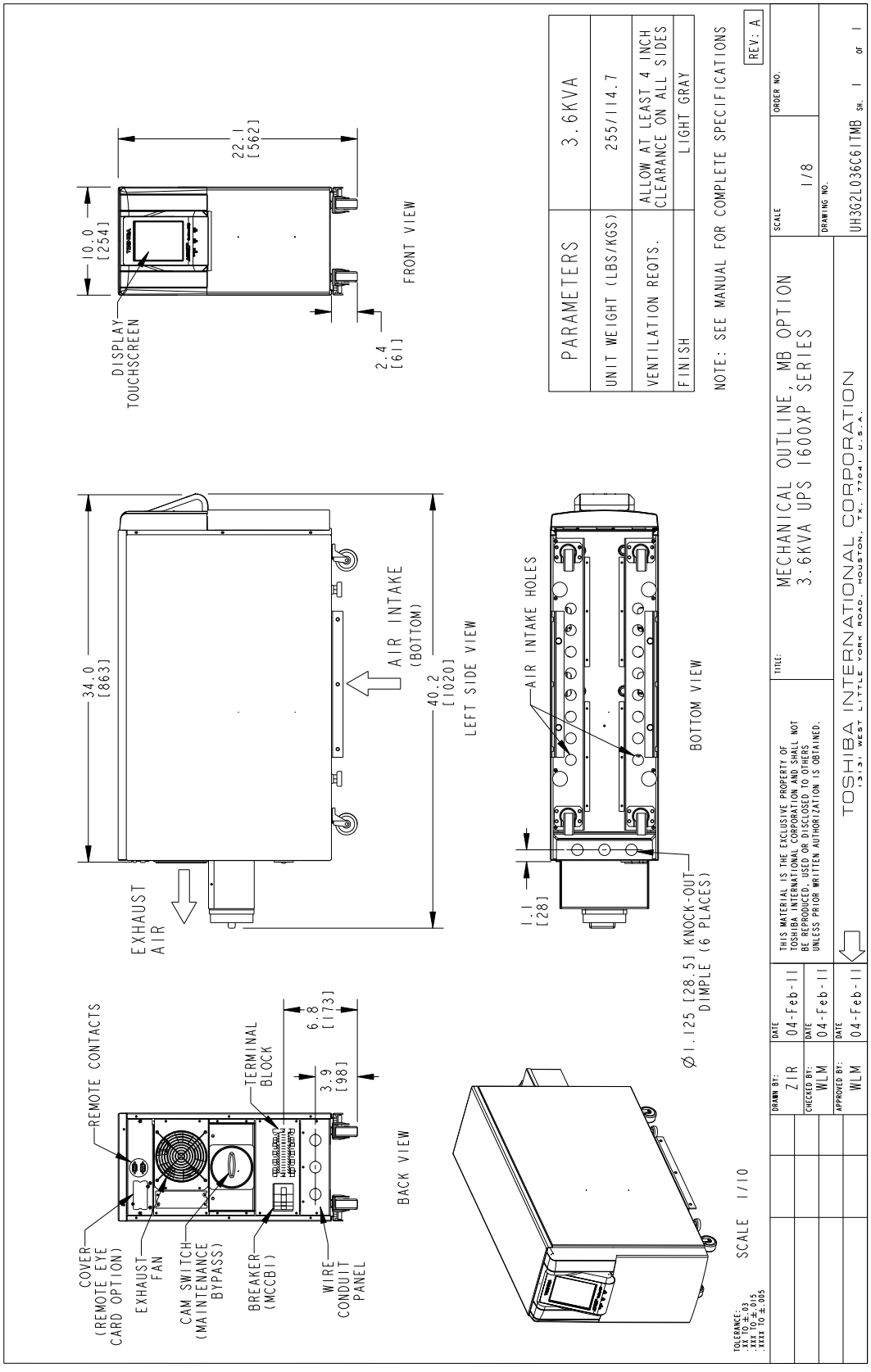
1600XP Command Parameters Table							
Cmd ID	Description on LCD	Brief Description	Location Map		Example	Rqd Security Level to change	By
			Tab	Block			
824	En Wrn LED Blink	Enable Warning LED	Settings	D&R	0	Changeable Changeable Changeable	User Administrator Service
825	En Run/Stop Diff	Enable Run/Stop	Settings	D&R	0	Changeable Changeable Changeable	User Administrator Service
826	En LB Flt Led	Enable LB Fault LED	Settings	D&R	0	Changeable Changeable Changeable	User Administrator Service
830	Test Mode	Test Mode	Settings	D&R	0	Changeable	Service
831	En LCD Test	LCD Test Mode	Settings	D&R	0	Changeable	Service
832	En Buzz Test	Buzzer Test Mode	Settings	D&R	0	Changeable	Service
833	En Blight Test	Backlight Test Mode	Settings	D&R	0	Changeable	Service
839	Test Result	Displays results of selected system test.	Settings	D&R		Changeable Changeable Changeable	User Administrator Service
840	Disp DBG Info	Display Debug Information	Settings	D&R	0	Changeable	Service
850	Reye Ins Dat	DC	Monitor	D&R		Changeable Nonchangeable	User Administrator
856	REye Baud*	Remote Eye's Baud Rate - Non-volatile configuration. Default from factory is 57600.	Settings	D&R	57600	Nonchangeable Changeable Changeable	User Administrator Service

Appendix C: 1600XP Dimensions and Weights

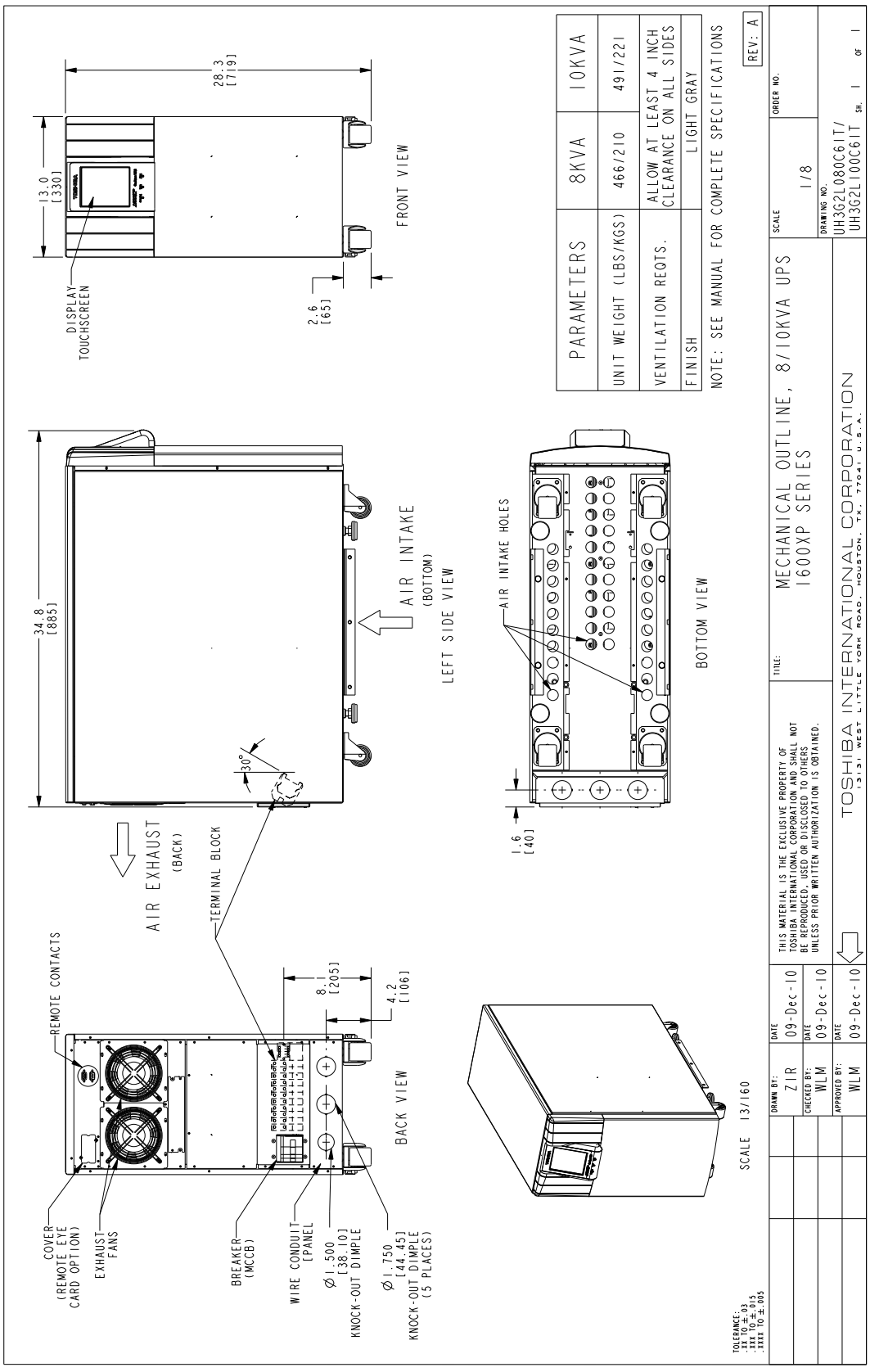
3.6-6 kVA Dimensions



3.6 kVA Dimensions w/ MBS



8-10 kVA Dimensions


28.3 [719]
13.0 [330]
DISPLAY TOUCHSCREEN
2.6 [65]
FRONT VIEW
PARAMETERS | 8KVA | 10KVA
UNIT WEIGHT (LBS/KGS) | 466/210 | 491/221
VENTILATION REQTS. | ALLOW AT LEAST 4 INCH CLEARANCE ON ALL SIDES
FINISH | LIGHT GRAY
NOTE: SEE MANUAL FOR COMPLETE SPECIFICATIONS
REV: A
34.8 [885]
AIR INTAKE (BOTTOM)
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COVER (REMOTE EYE CARD OPTION)
EXHAUST FANS
BREAKER (MCCB)
WIRE CONDUIT [PANEL
Ø1.500 [38.10] KNOCK-OUT DIMPLE
Ø1.750 [44.45] KNOCK-OUT DIMPLE (5 PLACES)
SCALE 13/160
TOLERANCE: .XX TO ± .03 .XXX TO ± .015 .XXXX TO ± .005
DRAWN BY: ZIR DATE 09-Dec-10
CHECKED BY: WLM DATE 09-Dec-10
APPROVED BY: WLM DATE 09-Dec-10
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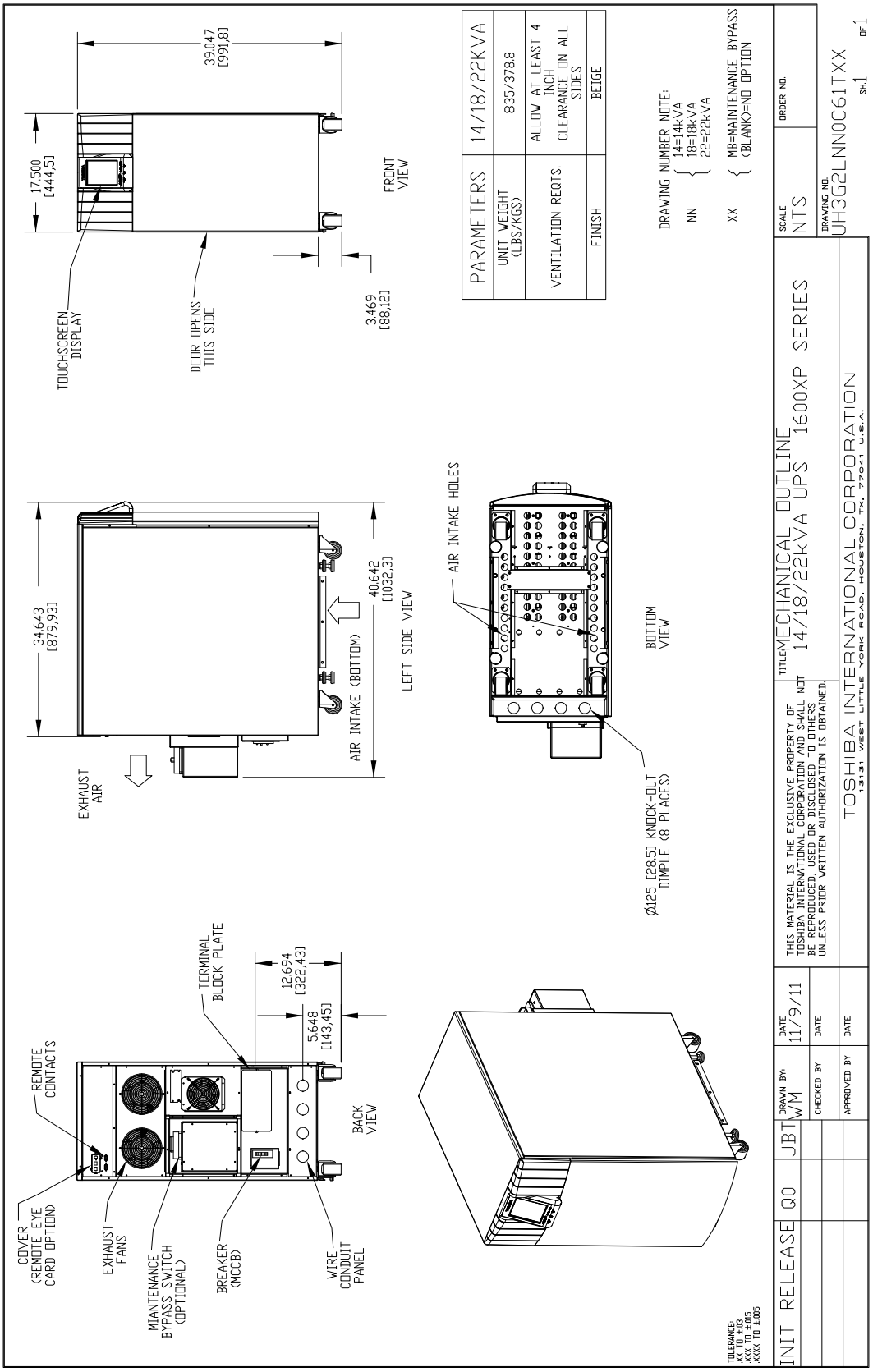
TITLE: MECHANICAL OUTLINE, 8/10KVA UPS 1600XP SERIES
TOSHIBA INTERNATIONAL CORPORATION
13131 WEST LITTLE YORK ROAD, HOUSTON, TX. 77041 U.S.A.
SCALE 1/8
DRAWING NO. UH3G2L080C61T/ UH3G2L100C61T
ORDER NO.
SH. 1 OF 1

14 / 18 / 22 kVA Dimensions (w/ Optional MBS)



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Printed in the U.S.A.